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OBSTRUCTION OF THE CENTRAL RETINAL VEIN.*

By F. H. VERHOEFF, A.M., M.D.,

PATHOLOGIST AND ASSISTANT OPHTHALMIC SURGEON, MASSACHUSETTS CHARITABLE EYE AND EAR INFIRMARY, BOSTON.

(*With thirteen figures on Text-Plates I.–III.*)

THE ophthalmoscopic picture of thrombosis of the central retinal vein has generally been regarded as definite and characteristic. Yet in a large proportion of the cases anatomically examined in which this diagnosis has been made, the central vein has been found patent and comparatively normal. In fact, previous to the recent publication of Harms, obstruction of the vein had been conclusively demonstrated in no more than six cases, in each of which it was attributed to thrombosis. In the eight cases of Harms, the obstruction was described as due wholly or in part to thrombosis in six. This would seem to indicate that the most common cause of obstruction of the central vein was thrombosis. A more critical analysis of the literature, however, does not substantiate this view, but goes to show that except in two special cases of thrombosis, due to sepsis, proof is lacking that this process occurred in any of the cases.

The six cases here to be described, in each of which the obstruction was due entirely to proliferative endophlebitis, seem to throw additional light on previous cases, and to indicate that in most, if not all, of them the

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obstruction was of a like nature. The first case occurred in the private practice of Dr. Allen Greenwood, of Boston, to whose courtesy I am indebted for the enucleated eye and also for the clinical data. For the privilege of reporting the clinical features of the second case I am indebted to Dr. F. E. Cheney, on whose service at the Infirmary it occurred.

CASE I.—*Hemorrhagic retinitis with classical ophthalmoscopic picture of thrombosis of central retinal vein. Acute glaucoma. Iridectomy. Enucleation six days after onset of glaucoma and twenty-six days after onset of dimness of vision. Anatomical findings: Complete obstruction of central retinal vein behind lamina cribrosa, due to endophlebitis proliferans. Hemorrhagic retinitis with marked retinal œdema. No atrophy of optic nerve or retina, no cupping of optic disk.*

Mrs. R. E. D., aged sixty-three, was first seen by Dr. Greenwood February 19, 1906. Patient stated that sight of left eye had been blurred for a week. No pain at any time. Examination: left eye, light perception only, pupil normal, tension normal. Fundus shows hemorrhages everywhere, veins much dilated, dark and tortuous, arteries small, outline of disk obscured. Retina very hazy. Diagnosis: thrombosis central retinal vein. Right eye, vision normal, fundus normal, with the exception of a questionable thickening of the walls of some of the retinal vessels. General health good. Physical examination negative, heart normal and no evidences of general arterio-sclerosis. Urine examination negative for albumin and sugar. Thirteen days later the left eye became very painful, and an unbearable neuralgia involved the left side of head. When seen on the following day the left eye was found congested and stony-hard, the pupil dilated and showing a grayish-green reflex, the cornea steamy, and the anterior chamber almost obliterated. No perception of light. Under ether, iridectomy was attempted, but only a small section of the iris could be removed. This only partly relieved the pain and slightly reduced the tension. Owing to the severe pain, enucleation was performed March 10, 1906, twenty-six days after the onset of dimness of vision and six days after the onset of glaucoma.

PATHOLOGICAL EXAMINATION.

After hardening several days in formalin, the globe was sectioned horizontally above the optic disk. Diameters of globe: Antero-post., 23.5*mm*, horizontal, 24*mm*, vertical, 23.5*mm*.

The cornea is clear, but is collapsed owing to the opening of the iridectomy wound during the enucleation. Except for the presence of the small coloboma of the iridectomy, the iris appears normal. The anterior chamber is obliterated (due to opening of wound). The lens, 4.25*mm* and 9.75*mm* is normal. The vitreous humor is represented by a soft fluffy coagulum, evidently due to presence of albumin, but is free from blood. The choroid is normal. The retina is in situ, is swollen, cloudy, and covered with hemorrhages. The latter are most numerous about the disk, where they are usually striate, and become fewer in number and punctate in form towards the periphery. No hemorrhages visible to the naked eye occur nearer than 6*mm* to the ora serrata. The retinal veins are greatly distended and very tortuous. The macula projects forward as a little mound and shows in its centre a small dark spot .25*mm* in diameter. The disk is little if at all swollen, but its outline is markedly obscured. The nerve was cut 5*mm* long.

Histological Examination.—Imbedding in celloidin. The anterior portion of the eye was sectioned horizontally. Longitudinal sections were made of the optic nerve with the retina until the central vessels were nearly reached, when the remaining portion was reimbedded and serial cross-sections made, taking in its entire length and including the disk. The entire series of sections through the part of the vein involved in the endophlebitis were stained, mounted, and examined. Most of the sections were stained in hematoxylin and eosin, others in Van Giesen's stain, and some in Weigert's elastic-tissue stain.

The cornea is normal, shows no œdema or cellular infiltration. The subepithelial tissue at the limbus shows only a slight inflammatory reaction. The ligamentum pectinatum is normal, and the canal of Schlemm is open and contains blood. The root of the iris in some places is in contact with

the ligamentum pectinatum, but there is no fusion of the two structures. The iris stroma is normal, except at one place where it shows an interstitial hemorrhage, evidently due to the trauma of the iridectomy. The ciliary body and its processes are congested but otherwise normal, except that the processes are dragged forward. The pars ciliaris retinæ shows some (senile) hyperplasia posteriorly. The vitreous humor is free from blood corpuscles, but is infiltrated with a faintly granular material staining in eosin, unmistakably coagulated serum. The choroid and pigment epithelium are normal; the latter shows no colloid excrescences. The choroidal vessels are distended, but their walls are normal.

The retina shows only two kinds of histological changes, namely, œdema and hemorrhage, but these are extremely marked. The œdema is most manifest in the layer of Henle, where large cystic spaces are formed. In the macular region these cystic spaces are relatively enormous and practically divide the retina into two layers (Figs. 1 and 2). The spaces are often apparently empty, but not infrequently contain fibrin and a greater or less number of red blood corpuscles. On the nasal side the œdema extends to within *2mm* of the ora serrata, while on the temporal side it almost completely disappears within *1cm* of the ora serrata. The hemorrhages are widespread, but are not excessively large. They occur up to within a short distance of the ora serrata on each side. Some sections, however, show them absent in the œdematous retina on the nasal side, although present on the other side, so that the amount of œdema bears no relation to the amount of hemorrhage. The hemorrhages are most numerous in the nerve-fibre layer, but also occur in the internal nuclear layer, from which they sometimes extend into the œdematous spaces in the layer of Henle. There are no subretinal hemorrhages, and none into the vitreous humor. Subhyaloid hemorrhages are occasionally seen. One such is in the macula, to which is due in great part the dark spot in its centre seen macroscopically. The blood corpuscles are well stained everywhere, and the retina shows no colloid material or hematoidin granules. Sections stained differentially for iron, however, show here and there a cell containing hemosiderin. Some of these cells are met with in the walls of the vessels.

The multipolar ganglion cells are remarkably well preserved both in the macula and elsewhere. Their cytoplasm is sometimes highly vacuolated or the cell bodies swollen and transparent, but the nuclei seldom show any signs of necrosis. The retinal vessels show little departure from the normal. The veins are distended, and some of the vessels possibly show slight thickening of their walls, but the latter are never hyaline, and there is no proliferation of the intima. The retina is nowhere infiltrated with chronic inflammatory cells.

The optic disk presents an almost normal appearance. It is perhaps somewhat œdematous, but so slightly that it does not project above the level of the surrounding retina (Fig. 1). It contains a few small scattered interstitial hemorrhages, most numerous near the surface, but reaching as far back as the lamina cribrosa. The nerve stem shows marked œdema, which, however, does not involve its entire length, but is roughly limited to the portion in which occurs the obstruction in the central vein. Here the spaces along the trabeculæ are widely dilated and the nerve bundles also separated by cystic spaces. The œdema is most marked at the periphery of the nerve, and gradually decreases towards the central vessels. The nerve shows no atrophy. There seems to be an increased number of glia cells, but the number is probably within normal limits. No mitotic figures are to be seen among the cells, as might be expected if they were undergoing active proliferation. There are within the nerve a considerable number of corpora amylacea, both large and small.

THE CENTRAL VESSELS.

The central artery, as well as its two main branches, seem comparatively normal. There is undoubtedly some atrophy of the media within and for some distance posterior to the lamina cribrosa, but the intima and internal elastica are perfectly normal. The central vein (Fig. 3) appears essentially normal also until it reaches the posterior part of the lamina cribrosa. The two main branches of the vein in the disk are dilated, and contain a variable number of red blood corpuscles, but no serum. In the central vein itself the red blood corpuscles become fewer, and just before the lamina

cribrosa is reached the lumen becomes filled with serum, which contains only an occasional leucocyte and red blood corpuscle, a condition that persists so long as a lumen is visible.

As the vein is followed backward it decreases somewhat in diameter, and in the posterior part of the lamina cribrosa begins to show proliferation of the intima. The first evidence of the latter process is the appearance of a few fusiform cells immediately beneath the endothelium on the side of the vein away from the artery. Sometimes they seem to have been formed by proliferation of the endothelium, but it is impossible definitely to determine this point, since similar appearances could be produced by proliferation of the subendothelial connective-tissue cells. These cells increase in number, involve a wider extent of the vein wall, and there now appears a layer of fibrous tissue beneath the endothelium to which the cells have evidently given rise (Figs. 4 and 5). Occasionally one of the cells contains two nuclei or shows mitosis. The endothelium remains intact so long as a lumen is recognizable. Coincident with the appearance of the fibrous layer beneath the endothelium, reticular spaces make their appearance between it and the adventitia, which are formed by minute fibrous offshoots from the fibrous membrane (Fig. 6). Each of these spaces is usually occupied by a large cell, whose cytoplasm at first sight appears perfectly transparent, but which on closer examination is found to be finely granular. The nucleus of this cell seems always to be situated at its periphery, and is oval in shape. Occasionally the nucleus is degenerated and shows fragmentation. Within the reticulum may also be seen an occasional space containing red blood corpuscles. Some of the sections show these spaces continuous with small collaterals of the vein. A small amount of colloid material is also sometimes seen, due no doubt to degeneration of the cells.

The whole inner wall of the vein has now become involved, but not evenly so, the changes being most marked on two opposite sides. Still farther back the reticulum becomes coarser in character, the spaces larger but less numerous. The lumen at the same time becomes smaller, as does also the entire cross-section of the vein, owing probably to contraction

of the fibrous tissue. The new tissue is also now more intimately blended with the adventitia so that the line of demarkation between the two is indistinct. A short distance anterior to the point where the lumen disappears, the proliferated intima takes on a still different appearance (Fig. 7). It loses its reticulated structure and becomes fibrillar in character, the fibrillæ having a more or less concentric arrangement with regard to the lumen. There are also fewer cells to be seen. The lining endothelium, as already stated, remains intact to the last, in fact it can be seen in a few sections after the lumen is no longer recognizable (Fig. 8). After the disappearance of the lumen the tissue filling the vein again assumes a coarsely reticulated structure. The appearance presented is now that of a small area of reticulated fibrous tissue surrounded by and blended with an irregular layer of more compact fibrous tissue, the adventitia of the vein (Figs. 9 and 10). Following the vein backward, the thickening of the intima decreases, and a lumen again becomes recognizable but is completely collapsed. Owing to this collapsed condition it is difficult to determine the exact point at which the lumen reappears. In fact it cannot be recognized with certainty until it is possibly of almost normal size (Fig. 11). For this reason also the changes in the vein wall are not easily made out, but they appear to correspond in an inverse order to those described as the obliterated portion was approached. The vein remains collapsed to the end of the nerve, but here and there a few red blood corpuscles can be seen in it. It is noteworthy that the collapse takes place in a direction almost exactly at right angles to that in which it was contracted by the proliferated intima.

Sections of the part of the vein involved in the endophlebitis, stained by Weigert's method, show a complete absence of elastic tissue both within the adventitia and in the proliferated intima. On the other hand, the fibrillæ and reticulum of the latter stain red in Van Giesen's stain, but not intensely so. There is nowhere any cellular infiltration about the vein or within the adventitia. The latter is perforated at intervals by small collaterals, but shows no abnormal vascularization. No pigment of any kind is to be seen in the proliferated tissue of the intima.

By comparing certain "landmarks" in the deepest longitudinal section with corresponding ones in the cross-sections, it is easy to arrive at an accurate estimate of the length of vein involved. The endophlebitis is first plainly recognizable at a point .5*mm* behind the choroid, almost on a level with the termination of the subdural space. The total length of vein involved is found to be almost exactly .65*mm*. The portion completely obliterated began at a point .8*mm* behind the choroid and was certainly no more than .15*mm* in extent and probably less. This could not be more accurately determined owing to the collapsed condition of the vein behind the obstruction. These measurements closely correspond with those obtained by counting the sections. Measurements of the thickness of the vessel walls, etc., will be found in the descriptions of the illustrations.

REMARKS ON CASE I.

This case seems to be unique, in that the anatomical examination showed that the pathological changes were much more recent than in any other case yet reported. The clinical features of the case accorded with the classical description of thrombosis of the central vein. The sudden onset of dimness of vision without complete loss of sight, the haziness of the retina, the dilatation and tortuosity of the veins, and the retinal hemorrhages clearly pointed to complete venous obstruction. Microscopic examination showed that the central vein was in fact completely occluded, but not by a thrombus. The obstruction was due entirely to obliterative endophlebitis, not even in part to thrombosis. The new-formed tissue in the vein presented the characteristic appearance of proliferated intima, and the serial sections showed the stages in its development probably as clearly as if the vein had been examined at different intervals of time. Aside from this, the transition from the place where the proliferation was first noticeable to the place of complete obliteration was too gradual to admit of the possibility of an organized

thrombus. The histological evidence is still more conclusive when considered in connection with the clinical history. For it is inconceivable that within a space of less than 26 days a thrombus could be organized and completely converted into connective tissue without leaving a trace of its original structure and without producing any reaction within and about the vein wall. It might be urged that it is unsafe to rely upon the clinical history for estimating the duration of the process, if it were not that the microscopic findings confirmed the clinical evidence by showing that the retinal changes were recent. That the obstruction was of recent date was shown also by the collapsed and empty condition of the vein behind it.

The question arises as to the cause of the endophlebitis. There were no manifest signs of general vascular degeneration, and both nephritis and syphilis were apparently excluded. It is well known, however, that sclerosis may exist in the smaller vessels without involvement of the larger vessels of the body, a fact that seems to explain certain obscure conditions of the brain. But in this connection it must be noted that none of the other vessels about the eye, including the posterior ciliary, showed any degenerative changes, and the central vein itself was only locally affected. The important etiological factor was probably the age of the patient (sixty-three years). The situation of the process, just behind the lamina cribrosa, is perhaps accounted for by the fact that here the nerve, and with it the vein, is necessarily subjected to the greatest strain during the movements of the eye. This might act as a stimulus sufficient to cause proliferation of an intima already on the point of senile hyperplasia.

It is interesting that the onset of symptoms was as sudden as would have been expected had the case really been one of thrombosis. It is not impossible, however, that the vision was considerably reduced before the

attention of the patient was attracted to the fact, and that not until the obstruction had become marked enough to cause hemorrhage, perhaps in the macula, was dimness of vision noted. On the other hand, the comparatively normal condition of the multipolar ganglion cells, and the fresh condition of all the hemorrhages, showed that the retinal changes were of recent date. Although the vein was completely closed for only a short distance, no more than .15*mm*, it is probable that this distance was even less at the onset of symptoms, because it is obvious that the collapse of the lumen might have allowed the tissue on each side of it to have become fused.

The cause of the glaucoma in this case seems sufficiently clear. It was no doubt due to the excess of albumin in the vitreous humor derived from the retinal veins and capillaries. That the vitreous humor was loaded with albumin was shown by the fact that it was found coagulated (by the action of the formalin) when the eye was opened. The excess of albumin would cause increase of tension probably, not on account of its slow filtration into the canal of Schlemm, as has been supposed, but on account of the high osmotic pressure it would set up. This would tend to force the iris forward, occlude the filtration angle, and thus render the condition permanent.*

Among the minor points of interest in this case were the extreme œdema of the retina, the hemorrhage in the macula, and the absence of papillitis. That the œdema should be most manifest in the layer of Henle is easily understood, since little resistance would here be offered

* I do not regard this as necessarily lending support to the theory of Uribe Troncoso that glaucoma in general is due to an excess of albumin in the intraocular fluids. In ordinary cases of glaucoma the amount of albumin in the vitreous humor is slight, and is probably secondary to the venous congestion produced by the high intraocular pressure.

to the pressure of the transuded fluid. The hemorrhagic extravasations occurred in all the retinal layers, but were never forcible enough to rupture the hyaloid membrane or the membrana limitans externa. This would indicate that they were always due to diapedesis and not to rupture of vessels, and as a matter of fact no ruptured vessels were found. This fact would explain the hemorrhage in the macula where only small vessels are present. The localized œdema in the nerve stem, corresponding to the portion in which the obstruction occurred, seems hitherto not to have been noted. The absence of papillitis is an interesting fact, since it indicates that papillitis cannot be secondary to retinal œdema.

CASE 2.—*Hemorrhagic retinitis followed by acute inflammatory glaucoma. Posterior sclerotomy. Iridectomy. Enucleation five months after onset of symptoms. Death one year later. Anatomical findings: Advanced glaucoma, with deep cupping of optic nerve. Almost complete obstruction of central retinal vein due to endophlebitis, with dissecting aneurism posterior to obstruction. High-grade endarteritis of central retinal artery, with dissecting aneurism and formation of new central artery within the old one.*

Annie C., aged seventy, admitted to the Massachusetts Charitable Eye and Ear Infirmary, April 28, 1902, service of Dr. Cheney. On March 4th patient had visited Out-Patient Department, at which time it was noted that the left eye showed retinitis (œdema), with a few small retinal hemorrhages and marked dilatation and tortuosity of the veins. The eye was somewhat red and painful at this time or shortly afterwards. Patient now complains of much pain, and states that she has not been able to see with left eye for about a month. Examination: Left eye shows considerable ciliary injection. Cornea hazy. Iris discolored; pupil small and unreacting. T+. No fundus reflex. Light perception only. Right eye white; vision with + 3 sph., 20/100. Visual field normal for form. Fundus not examined, owing to small pupil. General condition of patient good.

April 30th.—Posterior sclerotomy. No relief from pain followed.

May 7th.—Iridectomy.

May 9th.—Considerable amount of blood in anterior chamber. Much injection.

May 14th.—Tension and ciliary injection less; no pain. Discharged.

June 18th.—Readmitted on account of severe pain. Slight ciliary injection, cornea hazy and anæsthetic. No fundus reflex. T + 2.

June 23d.—Objective signs unchanged; no pain. Discharged.

July 26th.—Readmitted. Pain severe.

July 28th.—Enucleation.

It has since been learned that the patient died about one year later.

PATHOLOGICAL EXAMINATION.

After fixation in formalin the globe was sectioned in a horizontal plane passing through the upper part of the optic nerve. Diameters of globe: vertical, 25*mm*; horizontal, 25.10*mm*; antero-posterior, 25*mm*.

The cornea, 12*mm* in diameter, is clear but somewhat thinned in the centre (.6*mm*). The upper margin of the iridectomy coloboma is caught in the corneal incision. The root of the iris is firmly adherent to the cornea, etc., for a distance of 1*mm* all around. The anterior chamber contains a small hyphema. The lens, 9*mm* × 4*mm*, is apparently normal. The vitreous humor is of normal consistency but cloudy, owing to presence of blood and gray and white flocculi. The choroid is apparently normal. The retina is in situ and studded with hemorrhages, which occur up to within 6*mm* of the ora serrata, and are most numerous in the region of the equator. The small hemorrhages are punctate in form and about .6*mm* in diameter; the larger appear as conglomerations of the smaller. The retina appears thinner and more transparent than is normal. It shows no white patches except a very small one 5*mm* from the disk. The retinal vessels appear as white threads on the disk, from which they can be followed into the retina when they do not appear unusually

tortuous. The disk shows a deep cup (1.5*mm*) with overhanging edges. The latter, as well as the surrounding retina, is greatly swollen. The optic nerve is translucent and its striations are obscured—is evidently completely atrophic. It is cut 3*mm* long.

Histological Examination.—As in Case 1, longitudinal celloidin sections were made of the optic nerve until the central vessels were approached, when the remaining portion was reimbedded and serial cross-sections made, 8 microns in thickness. From the middle of the cup, all the sections were stained and examined with the exception of two, which were accidentally destroyed. The remainder of the eye was sectioned in the usual manner.

The cornea is apparently normal. The anterior chamber contains a considerable amount of blood and numerous pigmented cells. The iris is highly atrophic, and shows migration of cells from the pigment layer into its stroma. Its root is fused with the cornea and ligamentum pectinatum. Here in places the iris stroma has entirely disappeared, leaving only the pigment layer. The spaces of Fontana are obliterated, evidently by compression. The canal of Schlemm is represented by a narrow slit containing blood. The ciliary body and its processes are greatly atrophied. The pars ciliaris retinæ shows very little hyperplasia. The choroid is greatly thinned, and the membrane of Bruch in places stains deeply in hematoxylin, indicating degeneration. The pigment epithelium also shows marked degenerative changes, probably senile in nature. The posterior ciliary vessels show comparatively slight degenerative changes, the most noticeable consisting in an irregular increase in the elastic elements of the arteries.

The retina is atrophic throughout and shows an increase in its supporting tissue, especially near the ora serrata, where it is converted almost entirely into neuroglia. The multipolar ganglion cells have everywhere disappeared. Œdema is marked only near the disk, and here it does not reach the extreme grade seen in Case 1. Near the disk the outer nuclear layer with the layer of Henle shows numerous large and small spaces between the nuclei and fibrils. Elsewhere the relationship of the various retinal layers is little disturbed, and the

internal and external nuclear layers appear comparatively normal. The nuclei and fibrils of the latter layer, however, stain intensely blue in phosphotungstic acid hematoxylin, a possible indication of degeneration. The rods and cones are apparently normal. Beginning at the disk margin there is a layer of vascularized connective tissue that for a short distance grows over the surface of the retina. The retina is here thrown into folds and shows marked gliosis, evidently due to the contraction of this tissue. The hemorrhagic extravasations are most numerous in the nerve-fibre layer from which they sometimes extend into the external layers also. The hemorrhages have nowhere broken into the vitreous humor or become subhyaloid. The blood corpuscles show no disintegration, but in some of the extravasations they stain much more deeply than in others. The retina shows no colloid material or hematoidin granules, but cells packed with pigment giving the iron reaction are numerous. The nerve-fibre layer is often stained diffusely blue by the differential stain for iron.

The retinal vessels show marked degeneration. This is most often of the hyaline type, the whole vessel wall not infrequently consisting of hyaline substance free from nuclei, which fails to stain. Occasionally the lumen is entirely obliterated, the vessel then being represented by a hyaline column. This condition is most frequent towards the periphery of the retina. Some of the larger vessels show changes analogous to those in the central artery—that is, proliferation and degeneration of the old intima, with formation of a new fairly normal intima around the narrowed lumen. In many of the vessels the blood has lost its hemoglobin and fails to stain, so that when their walls are hyaline the vessels are difficult to make out. Sections stained lightly in Mallory's connective-tissue stain bring out these vessels well, the hyaline walls staining distinctly blue. The vessels along the side of the optic excavation are even more degenerated than the retinal vessels proper. In some of these the lumina are obliterated by large transparent cells, evidently swollen endothelial cells.

The optic nerve. The nerve fibres of the optic disk have been entirely replaced by proliferated neuroglia, a layer of

which now lines the deep excavation. The nerve stem shows advanced atrophy, evidenced by the marked thickening of the fibrous septa and the overgrowing of the nerve bundles with neuroglia. It is also highly œdematous. The fibrous tissue accompanying the central vessels is much increased in amount, and is fused with their adventitia.

THE CENTRAL VESSELS.

At the bottom of the excavation in the disk the central vein is found with an extremely small (.06*mm*) but still patent lumen lined with endothelium and filled with blood. The narrowing of the lumen is due to a marked thickening of the intima, which is composed chiefly of fusiform cells with poorly staining nuclei and transparent cytoplasm arranged concentric with the lumen. Between the cells fine fibrillæ can be seen. The thickening is much more marked on one side, so that the lumen has an eccentric situation. No definite fat spaces can be recognized; apparently the intima is in a stage preliminary to the hyaline condition found farther posterior. Ten sections farther back the lumen is still farther encroached upon by a growth of cells which apparently arise directly from the endothelium. These cells are connected with only one side of the lumen and form an irregular projection into it. The lumen is never entirely closed by the projection, but the space left in some of the sections is so small that the circulation must have been much impeded, if not practically cut off. The cells forming the projecting mass are sharply contrasted with those forming the chief thickening of the wall, owing to the fact that both their nuclei and their cytoplasm stain more strongly. In most of the sections the mass shows an indistinctly fibrillated intercellular substance. The degenerated intima at the periphery now takes on a hyaline fibrous character, its nuclei largely disappear, and it becomes blended with the adventitia, from which in fact it cannot be distinguished. The central projection lasts for eleven sections when it gradually becomes smaller and finally disappears. In the following section a small collateral is seen to join the vein (Fig. 12). This does not enter directly into the lumen but passes into the intima, which now again shows a reticulated structure with large

spaces. The next sections show the single space into which the collateral entered divided into two, so that including the original lumen which is displaced to one side there are now three lumina (Fig. 13). All three lumina are lined with definite endothelium and contain blood. Here and there they communicate with each other through small breaks in their walls. Posteriorly these breaks become larger and it is in this manner that the lumina finally disappear. The last trace of them is a little spicule projecting from the vein wall. This peculiar condition in the vein, which is evidently in the nature of a dissecting aneurism, is included within 20 sections, a distance of about .16*mm*. In this portion of the vein no collateral enters other than that mentioned. After this the vein takes on a comparatively normal appearance although in places it shows more or less thickening of the intima.

The central artery shows a free lumen to the end of the nerve, which, however, posteriorly is much reduced in size. The intima shows degenerative changes in all of the sections, but in some they are not marked. The changes met with are chiefly of two kinds. The most common consists in the occurrence of a transparent highly vacuolated substance between the lumen and the internal elastica. In some sections the vacuoles are found to contain large cells with granular cytoplasm and degenerated nuclei, thus suggesting that the transparent substance is due to fatty degeneration of the intima. Where this degeneration is most marked, a new and normal-appearing intima is formed immediately beneath the endothelium, so that the appearance is produced of a vein in the centre of an artery. The other kind of alteration consists in the formation of a homogeneous hyaline or faintly granular layer internal to the internal elastica, with which it often appears to be fused. The media of the artery is everywhere highly atrophic and in places scarcely recognizable. The internal elastica is for the most part intact, but in places it stains deeply in alum hematoxylin, breaks up into granules, and disappears over small areas. There is nowhere an extensive new formation of elastic fibres in relation with the internal elastica. Near the end of the nerve the tissue between the new-formed intima and the internal elastica becomes completely degenerated and disappears,

leaving a space filled with blood. The source of the blood cannot be determined, owing to the fact that the nerve was not cut sufficiently long. Weigert's elastic-tissue stain shows that here there is a new internal elastica formed beneath the endothelium. Around the new elastica there is a layer closely resembling the media of a small artery which contains a number of very fine elastic fibrils. In this situation, therefore, a new central artery has been formed within the lumen of the old one. The lumen of the new artery is .08*mm* in diameter, its wall is .01*mm* thick, and the space around it filled with blood is .03*mm* wide.

REMARKS ON CASE II.

The clinical record of this case is unfortunately incomplete. All that can be said with certainty is that there was hemorrhagic retinitis with venous stasis, followed in four weeks by acute congestive glaucoma. This was temporarily relieved by iridectomy, but enucleation was finally necessary for the relief of pain five months after the retinal hemorrhages were first noted. The anatomical examination showed advanced glaucoma with deep cupping of the optic nerve, a condition that it is difficult to believe could have come about within five months. It is likely, therefore, that in this case the obstruction of the central vein was either secondary to or independent of the glaucoma. This was indicated also by the fact that the obstruction was not yet complete. It seems altogether probable, however, that the acute symptoms of glaucoma which finally led to enucleation were due to the venous stasis in the retina. Vision was also much reduced in the other eye, but the clinical record gave no definite clue as to whether or not this was due to chronic glaucoma. As in Case 1, the obstruction in the vein was not due to thrombosis, but to endophlebitis. While the lumen was nowhere completely obliterated, it was practically so just behind the base of the excavation in the nerve. The narrowing of the

lumen was evidently due to two processes which occurred at different intervals of time. The first process was a more or less uniform, though eccentrically situated, proliferation of the intima with hyaline degeneration of the new tissue. The second, which must have occurred much later, was a proliferation occurring in the form of an irregular cellular mass, evidently derived from the endothelium, which projected from one side of the lumen. It is no doubt such a mass as this, seen in a later stage perhaps, that has often been mistaken for a thrombus. A few sections farther back the lumen became of almost normal size, but was subdivided by septa into three separate compartments (Fig. 13). As will be pointed out again, such a condition has also been described by Coats,[16] Sidler-Huguenin,[17] and Harms,[18] who explained it as due to canalization of a thrombus. The complete set of serial sections made in this case, however, showed that this explanation was incorrect. The condition was clearly due to the undermining of the degenerated intima by the blood stream from a small collateral (Fig. 12). This, instead of separating the intima all around, bulged out the latter in two places only, due, no doubt, to the intima being more firmly adherent in some places than in others. The new lumina became lined by endothelium, probably by extension from the collateral and through breaks in their walls. It is evident that any number of lumina might be formed in this way. In Coats's case there were five; in Harms's six. In the case of Sidler-Huguenin the intima was evenly undermined all around anteriorly, but posteriorly there were three lumina. It would seem that a previous collapse of the vein may play some part in the occurrence of this condition; for it is evident that should the vein collapse, the blood from a collateral might force its way as readily beneath the intima as into the original lumen. In the present case, it is true, there was not complete obstruction of the vein, but the obstruction must have been great

enough to have allowed at least partial collapse of the vein before the collateral circulation was fully established.

The changes in the central artery were also of much interest in this case. So far as I am aware, the formation of an entirely new central artery within the lumen of the old, and surrounded by blood, has not hitherto been described. It is no doubt to be explained as follows: Owing to the complete degeneration of the tissue between the internal elastica and the new intima, a free space was formed which was soon filled with blood, probably from a collateral.* The tissue thus separated from the internal elastica then not only underwent further proliferation, but also differentiation, due perhaps to its better nourishment, so that a new internal elastica and apparently a new media were formed. A dissecting aneurism was also described by Sidler-Huguenin[17] in the central artery of his case, but it was of a different type from this, consisting essentially in a separation and rolling up of the internal elastica.

In addition to the two cases reported above in detail, I have examined, by means of serial cross-sections, four other cases with obstruction of the central vein. All were cases of advanced glaucoma with more or less indefinite clinical histories. The condition was monocular except apparently in one case in which the other eye had been enucleated four years previously for glaucoma with hemorrhagic retinitis. Two cases were in females. The ages were from sixty-three to seventy years. One patient became insane shortly after the enucleation, evidently due to degeneration of the cerebral vessels, and died about three years later. The obstruction of the vein was complete in all but one case, was situated within and behind the lamina cribrosa, and was due partly to sub-endothelial thickening of the intima and partly to endothelial proliferation into the lumen. In one case the

* In a more recent case of a similar nature I was able to find a fairly large collateral in communication with the space around the separated intima.

central artery was also completely obliterated by obliterating endarteritis. In another case, in which the obstruction of the vein was complete, there were no retinal hemorrhages, the retina showing only œdema and venous congestion, but there was a large hemorrhage into the vitreous humor from the disk, due to rupture of a main branch of the central vein. The other features of these cases do not seem of sufficient importance to merit a detailed description.

DISCUSSION OF PREVIOUSLY REPORTED CASES.

In the literature I have been able to find anatomical descriptions of thirty-nine cases which either presented the clinical picture of thrombosis of the central vein or in which a thrombus was supposed to have been found under the microscope. In thirteen of these cases the central vein was found patent. In each of the other cases an obstruction was described which in all but two was attributed to thrombosis. Of the twenty-six cases in which an obstruction was described, those reported by Michel,[1] Angelucci[2] (two cases), Weinbaum,[3] Wagenmann,[4] Türk,[5] Würdemann,[6] and Goh[7] have already been carefully analyzed by Reimar,[8] who concluded that obstruction of the central vein could be regarded as certainly present only in the cases of Michel, Weinbaum, and Türk, and that it was doubtful whether the obstruction was due to thrombosis or phlebitis proliferans. In this conclusion I concur, except that I regard it as possible that the obstruction in Weinbaum's case was apparent only, and the appearance described due to a plane section of the vein wall which was cut longitudinally. The same explanation seems to apply also to the case of Purtscher,[9] and no doubt to that of Bankwitz,[10] neither of which was considered by Reimar. The sarcoma-like cells described by Weinbaum could well have been the endothelial cells lining the vein. The appearance depicted by Purtscher

is frequently met with in longitudinal sections of vessels, due to the section passing through a fold in the wall. Bankwitz gives no illustration of his case, and his description of the "thrombus" is otherwise inadequate. He held that the latter was due to pressure from a small aneurism of the artery in the disk. Probably the aneurism was a fold in the wall of the artery. That there was no venous obstruction was indicated by the lack of retinal œdema.

Viewed in the light of the present cases, I think there is little doubt that in the cases of Michel and Türk the obstruction was due to obliterative endophlebitis. There certainly was not the slightest anatomical proof of thrombosis. As Reimar pointed out, there was no blood pigment in the new tissue, and no evidence of reactive inflammation about the vein in either case, although in each the lumen was completely closed. Dimness of vision came on suddenly, it is true, but my Case 1 shows that this may happen after obliterative endophlebitis. It seems not unlikely that the case of Goh[7] was really one of thrombosis of the central vein, although it is of little clinical importance. The thrombosis was only partial, and occurred, probably shortly before death, in a fatal case of stomatitis ulcerosa associated with general sepsis. There was no retinal œdema, and the retinal hemorrhages, which were present in both eyes, could not be explained by the thrombosis, since the central vein on the other side was patent, but were clearly due to the general sepsis. Another case of septic thrombosis, that of Gonin,[11] was also too complicated to be of much value from the standpoint of obstruction of the central vein. The thrombosis occurred after an attack of erysipelas complicated with orbital abscess. Ophthalmoscopic examination showed marked retinal ischæmia, with a few hemorrhages about the disk. The eye was obtained post-mortem about three months after the occurrence of the retinal hemorrhages, and on microscopic examination an organized

thrombus was found completely occluding the central vein *3mm* behind the globe. A thrombus was also found in the central artery, which, however, was thought to be more recent than that in the vein. In view of the retinal ischæmia, it would seem more likely that the artery was occluded first.

In addition to his first case, Michel has reported two others as cases of thrombosis of the central vein. His second case[12] was one of leukæmia, in which retinal hemorrhages were found post-mortem. The thrombus, which consisted of round cells, red blood corpuscles, and granular detritus, was found at the point of exit of the vein from the nerve, and was probably a post-mortem clot. Michel evidently does not himself attach much importance to this case, since in a later communication[13] on the subject he fails to mention it. In Michel's third case[13] the ophthalmoscopic picture was that typical of albuminuric retinitis. Neither the central vein nor artery showed proliferation of the intima. The thrombus was said to have been made up of blood plates, and was thought to be only three days old. Hence it could not account for the retinal hemorrhages which occurred long before, although the exact date is not stated. The eye was obtained post-mortem, and it seems probable that the thrombus in this case was also formed after death. In the case reported by Gauthier[14] the thrombus was evidently an artefact, probably a coagulum due to the fixing agent. The case of double thrombosis of the central vein described by Yamaguchi[15] seems improbable. The patient, aged twenty-five, was suffering from sarcoma of the brain. This gave rise to double choked disks, which led to double optic atrophy. Later the swelling of the disks reappeared, with picture of thrombosis of central vein in each eye. On microscopic examination the central vein on each side was found compressed by scar tissue at its point of exit from the nerve, while attached to the wall at this point were laminated

thrombotic masses. An objective description of the thrombus unfortunately was not given. Since obstruction of the central vein has never been known to produce choked disk, even when occurring just behind the latter, it seems clear that the recurrence of the choked disk was here due to the increase in the size of the brain tumor, and that the hemorrhagic retinitis was due to pressure on the vein in the disk.

Coats[16] has reported the microscopic findings in five cases of hemorrhagic retinitis. Actual obstruction of the central vein was certainly demonstrated in only two cases (Cases 3 and 5). Case 1 showed the typical picture of thrombosis of the central vein, but no thrombus was found. The intrascleral portion of the nerve was cut longitudinally, so that Coats himself suggests that an obstruction here might have been overlooked. This seems likely, inasmuch as the cross-sections of the nerve farther back showed proliferation of the intima of the vein. In Case 2 there was neuro-retinitis in each eye, with history of syphilis thirty years previously. In the left eye the neuro-retinitis was more marked and was associated with retinal hemorrhages. In this eye just behind the lamina the central vein was found divided by septa into five loculi containing blood, which Coats regarded as representing an organized and fully canalized thrombus. The ophthalmoscopic picture in this case was certainly not typical of thrombosis of the central vein, on account of the swelling of the disk. The fact that optic neuritis was also present in the other eye would seem to indicate that this was the primary condition in each, and that to it were due the retinal hemorrhages in the left eye. The condition existing in the central vein, as already mentioned, was similar to that in my Case 2, except that the vein was not occluded anteriorly. It was probably brought about in a similar way, however. The history of the case shows that there was complete loss of sight in both eyes about ten months previous to the

enucleation, which was probably due to double optic neuritis. No doubt the collapse of the vein which took place at that time allowed the degenerated intima to become undermined, as in my case. Coats's Case 3 was one of advanced glaucoma, with deep cupping of the disk, in which the retina was found covered with hemorrhages. Behind the lamina cribrosa the vein was entirely replaced by a knot of reticulated fibrous tissue, regarded by Coats as an organized thrombus. The lumen of the vein gradually became narrower until it was completely obliterated. Although it is stated that there was no endothelial proliferation, Coats's Fig. 7 shows plainly enough that the narrowing of the lumen was here due to thickening of the intima. In regard to the thrombus itself, Coats says: "That it is not merely an obliteration by endothelial proliferation is shown by a high-power examination of its structure, which shows it to be made up not of thick-walled vein, but of young connective tissue." This fact, however, as shown by my Case 1, for instance, does not exclude proliferation of the intima. In Coats's Case 4 the ophthalmoscope showed monocular hemorrhagic retinitis and œdema. One month later glaucoma ensued, which in twelve days required enucleation. Within the lamina cribrosa the central vein completely disappeared, but sufficient sections were not examined to determine the exact manner of its disappearance. In the following sections two small veins accompanied the artery. The artery showed marked endarteritis and contained an "organizing thrombus." Coats regarded the case as one of primary thrombosis of the central vein in which the thrombus had organized and become completely converted into connective tissue. The "thrombus" in the artery was thought to be secondary to the venous stasis. The disappearance of the central vein was possibly due to an unusual course taken by it, perhaps similar to that in Harms's Case 13, and illustrates the importance of having

no breaks in the series of sections in such cases. In Coats's fifth case the central vein also completely disappeared within the lamina cribrosa, reappearing farther back with a small lumen and very thick wall. Coats described the thickening of the wall as due to increase in the adventitia, not to endothelial proliferation. More probably it was due to proliferation of the intima, followed by hyaline degeneration of the new tissue, as in my Case 2. Anteriorly the lumen of the vein contained a "little shrunken knot of tissue" attached to the vein wall on one side only, which was regarded as an organizing thrombus. The illustration shows proliferation of the intima of the vein at this place, and it seems altogether probable that the projection into the lumen was due to endothelial proliferation. Still farther forward the lumen was found divided by two trabeculæ into three loculi, each lined with endothelium and containing blood. Coats offers no explanation of this condition, although according to the description it was similar to the "canalized thrombus" in his Case 2. In all probability it was due to dissection of the intima, as in my Case 2.

The case of Sidler-Huguenin[17] was analogous in many respects to my Case 2. The condition in the vein was described as a canalized thrombus, and the possibility of a different origin for it was not considered. In this case also there was a dissecting aneurism in the artery. The important features of the case were as follows: Female, aged sixty-nine, with an indefinite history of loss of sight and symptoms of acute glaucoma in one eye. Tension + 3. Retina covered with hemorrhages. No venous stasis. Light perception only. Other eye normal. Enucleation twenty-five days later. Pathological examination: Anterior part of eye not described. Retinal hemorrhages and marked sclerosis of retinal vessels. Optic disk deeply cupped. Intrascleral portion of optic nerve sectioned longitudinally, the remainder in serial cross-sections. Central vein showed a "canalized

thrombus" a short distance behind the lamina cribrosa. This consisted of a central strand of tissue, containing for the most part one lumen, but in some sections as many as three lumina, all lined with endothelium. The periphery of the strand as well as the surrounding vein wall was also lined with endothelium. Anteriorly the central lumen of the strand gradually became larger, and its wall finally became continuous with the intima of the vein proper. It was also attached over a small surface to the vein wall at one other place. The vein wall showed no vascularization or any evidences of chronic inflammatory reaction, and there was no pigment in the "thrombus." A similar explanation evidently applies to this case as to my Case 2. A fairly large collateral entered the vein at the point where the "thrombus" ended posteriorly, and it was no doubt here that the intima was first undermined and ruptured. Further separation was then probably produced by cicatricial contraction of the thickened intima. Whether or not the condition was preceded by collapse of the vein is of course uncertain in this case. It is noteworthy, however, that the portion of the vein which in my case was almost completely occluded was here sectioned longitudinally.

The most recent contribution to the subject of obstruction of the central retinal vein is that of Harms,[18] who reports eight cases.* In two cases there was also partial and in two complete obstruction of the central artery. All of the cases were examined by means of serial cross-sections, every fifth section being stained. In two of the cases the obstruction in the vein was attributed to endo- and meso-phlebitis alone, in six to endo-

* Since this was written a further communication on the subject by Coats[19] has appeared, too late, unfortunately, to be fully discussed in this paper. Coats reports eleven new cases, in all except one of which the obstruction is ascribed to thrombosis. In all of the cases, however, the obstruction was evidently of long duration, and in my opinion could well have been due to proliferative endophlebitis without thrombosis.

phlebitis with thrombosis. Harms does not make it clear, however, how he was able to distinguish between the two processes. He states that in all of his cases the new tissue in the vein was organized by proliferation of the endothelium, and that the adventitia around the obstruction in no case showed vascularization or evidences of inflammatory reaction. In no case also did the "thrombus" contain definite blood pigment. These facts certainly point more strongly to obliterative endophlebitis than to thrombosis. All of Harms's cases were evidently of long standing so that few indications of the early conditions could have remained. Thus in none of them was the obstruction so recent that the vein was still collapsed behind it, and in all of them the optic nerve was highly atrophic. In three of the cases there was slight, and in three deep cupping of the nerve. In one case, Case 8, the "thrombus" was described as canalized. Harms's Fig. 23 shows that the condition corresponded to that in my Case 2. It is also very similar to Coats's Fig. 5. Anterior to the "canalized thrombus" the vein was almost but not quite obliterated by proliferated intima. The explanation of this case, therefore, is apparently the same as that given for my Case 2 and for the case of Sidler-Huguenin. Harms's Fig. 20, Case 7, and Fig. 28, Case 10, also show conditions apparently due to separation of the intima, which Harms regarded as organized thrombi. In some of his cases the obstructing masses were separated from the vein wall posteriorly. This was no doubt due to the previous collapse of the vein behind the obstruction. It is obvious that when the vein again became distended with blood the wall would have tended to become separated from the contracted central core.

Thus out of 26 cases from the literature in which the anatomical diagnosis of obstruction of the central retinal vein was made, the veidence was inadequate to show that actual obstruction sufficient to account for the retinal

changes was present in more than fourteen. In only two of these was the obstruction certainly due to thrombosis, and in these it occurred as a result of sepsis. In the remaining twelve cases there was no evidence to show that the obstruction was not due entirely to proliferative endophlebitis. These were the cases of Michel,[1] Türk,[5] Coats[16] (Cases 3 and 5), and the eight cases of Harms.[18] It is therefore impossible to say that thrombosis of the central retinal vein ever occurs except as a result of sepsis. On *a priori* grounds, too, it seems unlikely that this process should occur spontaneously in a vessel so small as the central vein. For while degenerative changes in the intima may be relatively great, they are absolutely very slight compared to those in the larger vessels of the body, and the lumen of the vein so long as it is patent probably never loses its endothelial lining. The tendency seems to be in the case of the small vessel for a new and fairly normal intima to be continually reformed around the lumen, no matter how marked the degenerative changes may be between it and the adventitia. This is probably due to the better nourishment supplied to the tissue nearest the lumen. In certain cases in which a comparatively normal intima is formed immediately around the greatly narrowed lumen, the proliferated intima at the periphery takes on a hyaline fibrous character and fuses with the adventitia. Here the pathological condition may be overlooked and the vein regarded simply as having an unusually small lumen. In other cases the proliferation of cells near the lumen, evidently derived from the endothelium, is sometimes more atypical, so that an irregular mass projects into and partly or completely occludes the lumen. It is no doubt this central, better preserved cellular tissue, standing out in contrast to the more or less degenerated intima around it, that is often regarded as a thrombus. The variation in the character of the endophlebitic process in different cases probably depends upon variation

in the activity of the proliferation and upon the rapidity with which degenerative changes take place.

Of the eighteen cases of obstruction of the central retinal vein, including the six present cases and excluding the two cases of septic thrombosis, six were females. With the exception of Harms's Case 9, aged twenty, in which glaucoma was perhaps the primary factor, the ages were between forty-eight and seventy years. The average age was fifty-eight years. The right eye was attacked in seven cases. Albuminuria was present in three cases, absent in eight, and not noted in seven cases. In most of the cases the conditions of the vascular system, including the peripheral arteries, was not noted, but in five cases there were definite signs of general arteriosclerosis. No mention is made of syphilis or alcoholism as etiological factors in any of the cases. It seems safe to conclude, therefore, that the chief etiological factor was senility. Few of the cases were followed sufficiently long to afford any data in regard to prognosis as to life, but the presumption is, of course, strong that this must be unfavorable. In two cases the eye was obtained at autopsy, and in two others the patient died within three years after the enucleation. One patient was alive at the end of five years. Another was alive at the end of eight years, but during that time had several severe apoplectic attacks as well as an attack of hemorrhagic retinitis in the other eye. In all except one case, that of Michel, the obstruction was situated either entirely within, or more often behind and partly within, the lamina cribrosa. As pointed out in connection with Case 1, this might have been due to the fact that at its junction with the globe the nerve must be subjected to its greatest strain during the ocular movements.

The fact that obstruction of the central retinal vein has been demonstrated in so few cases is not necessarily an indication that the condition is excessively rare. More probably it is chiefly an indication of the infrequency

with which the optic nerve is examined in serial cross-sections. So, too, as Ischreyt[19] has pointed out, the frequency with which glaucoma occurs in the cases anatomically examined may be misleading, due to the fact that, as a rule, only those cases come to enucleation in which glaucoma ensues. That glaucoma does not always follow is shown by Michel's first case, in which the eye was obtained post-mortem sixteen months after the onset of the retinal hemorrhages. There was no glaucoma in Türk's case also, but death occurred soon after onset. In all the other cases there was glaucoma. More important than the frequency of the glaucoma in these cases is the fact that in all but one of them it was monocular. The conclusion from this fact would seem to be almost inevitable that the obstruction in the central vein was the cause of the glaucoma in most of them. Moreover, my Case 1 shows conclusively that acute glaucoma may be due to this cause. On the other hand, the fact that in many of the cases acute symptoms did not occur until the glaucoma had reached an advanced stage, as evidenced by deep cupping of the nerve, would seem to indicate that in some of these the obstruction was secondary to or independent of the glaucoma. Such a case, for example, was perhaps Harms's Case 9, in which the age of the patient was only twenty years. Further observations, however, are necessary before the question of the relation of chronic glaucoma to obstruction of the central retinal vein can be fully answered.

The question naturally arises as to the explanation of the cases presenting the ophthalmoscopic picture of obstruction of the central vein in which no obstruction has been found. Since most of the eyes were obtained by enucleation during life, as a rule only a small part of the central vein could be examined, so that in some cases it is possible that an obstruction was present farther back. Theoretically it might be expected that the point of exit of the vein from the nerve would be a favorite place

for endophlebitis, since here it must be exposed to considerable trauma during the movements of the eye. But until cases are forthcoming in which obstruction has actually been found at this situation the matter must remain one of speculation. Certainly it can be said from another standpoint, that in many of the cases of hemorrhagic retinitis associated with glaucoma the degenerated condition of the smaller retinal vessels would seem amply sufficient to account for the hemorrhages.

A certain number of cases of hemorrhagic retinitis have been reported in which the central artery was occluded while the central vein was supposed to be free. Some observers have regarded the condition as an hemorrhagic infarct. Reimar explained his case by assuming that before the stage of complete obliteration the artery became closed temporarily, owing either to the contraction of its musculature or to a lowering of the general blood pressure. On the return of the circulation, diapedesis took place from the small vesesls whose walls had been injured by the anæmia. Harms, however, takes exception to this view. He points out that in every case of obstruction of the artery the circulation returns sooner or later without, in the majority of cases, causing hemorrhage. He points out also that venous obstruction was not positively excluded in any of the cases of this kind. Harms explains these cases by assuming also a closing and opening of the artery, but he thinks the hemorrhages are due to the fact that the returning arterial blood stream meets with more resistance owing to the previous collapse of the degenerated veins.

CONCLUSIONS.

Complete obstruction of the central retinal vein, with the classical ophthalmoscopic picture of thrombosis of this vessel, may be produced by endophlebitis proliferans without thrombosis. The proliferation may involve

the sub-endothelial tissue alone, or the obstruction may be completed by a more active endothelial proliferation within the lumen.

All of the cases anatomically examined, in which obstruction of the central retinal vein has been attributed to non-septic thrombosis, can be explained by, and in all probability were due to, endophlebitis proliferans alone.

The so-called canalized thrombus of the central retinal vein is in the nature of a dissecting aneurism.

In certain cases obstruction of the central retinal vein may early give rise to acute glaucoma.

NOTE ON TECHNIQUE.

The usual method of preparing serial celloidin sections is not only laborious but often inaccurate, owing to the danger of misplacing or losing some of the sections. The following method does away with both of these objections. The specimen is imbedded so as to leave an excess of celloidin at its periphery all around. This is most easily accomplished by placing it in a paper box smeared on the inside with vaseline. After hardening in alcohol the specimen is mounted on a block and the excess of celloidin trimmed away as usual, except that an extra amount is left on the side opposite from the microtome knife. In cutting the sections, the knife is not carried entirely through the celloidin block, but an uncut edge about *3mm* wide is left each time. After twenty or more sections are cut in this way the knife is carried all the way through, thus producing a little book of sections. It is probably most convenient to keep each book in a separate bottle, but no difficulty is usually experienced in determining the proper order after the sections are mounted. Another way to keep them in order is to string them on a silk thread through their uncut margins. In beginning a new book a wider margin should be left for the first one or two sections, as otherwise the sections may not adhere. Each book is stained in the same manner as a single section, except that it is best to use slow-acting stains so that the staining will be uniform throughout. The individual sections are not separated until the book is in alcohol preliminary to clearing.

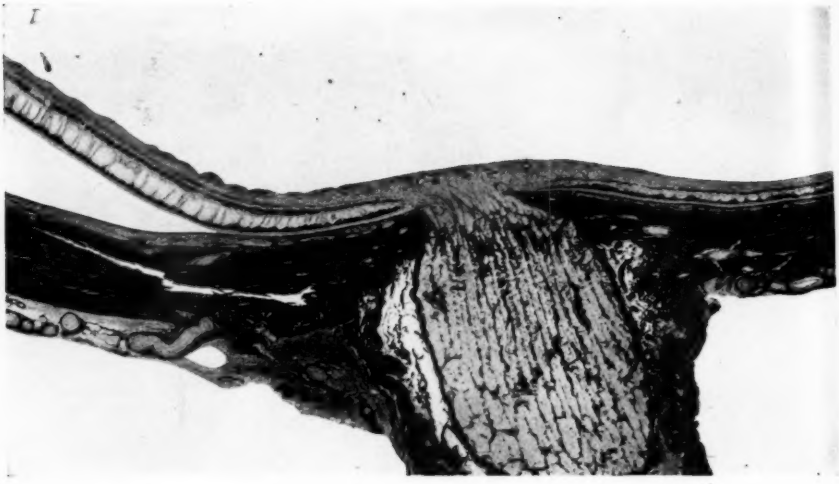

FIG. 1.

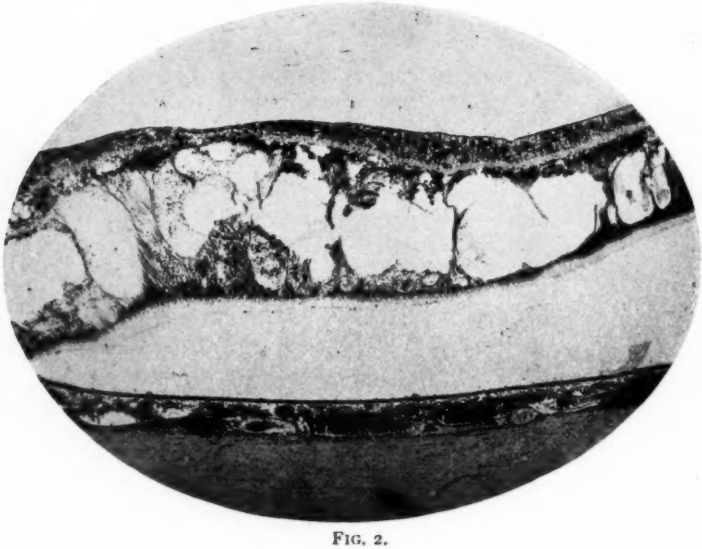

FIG. 2.

Then each section is either torn off with forceps, or the book is taken up on cigarette paper and the uncut margin removed with scissors. Each section in order is then removed, cleared quickly in oil of origanum, and placed on a slide. All the sections of one book are mounted on the same slide—a decided advantage. The sections can be cut as thin by this method as by the usual one. With a sharp knife they can easily be cut less than eight microns in thickness without destroying a single section.

DESCRIPTION OF ILLUSTRATIONS ON TEXT-PLATES I.–III.

The illustrations were all prepared from micro-photographs made by Mr. L. S. Brown of the Clinico-Pathological Laboratory, Massachusetts General Hospital.

Case 1.

1. Longitudinal section through the optic nerve at a depth of one-fourth its diameter. Note the marked œdema of the retina, the retinal hemorrhages and the absence of papillitis. The retinal œdema is most marked towards the macular region on the left where the layer of Henle is widest. (x 20.)

2. Section through macula near its centre, showing destructive action of œdema in layer of Henle. (x 42.)

3. Cross-section of central vessels in lamina cribrosa. The vein is dilated and shows only slight proliferation of intima. Diameter lumen of vein, 180μ–152μ. Thickness vein wall, 15μ, of artery wall, 20μ. (x 137.)

4. Section through posterior part of lamina cribrosa. The thickening of the intima of the vein is here plainly seen. Lumen much reduced in size, filled with serum. Diameter lumen of vein, 100μ–80μ, of artery, 180μ–120μ. Thickness intima vein, 20μ. Wall of artery, 20μ–30μ. (x 137.)

5. Six sections farther back. Note the condensation of fibrous tissue immediately about the lumen of the vein and the large clear spaces between it and the adventitia. These contain cells evidently in a state of fatty degeneration. Diameter lumen of vein, 90μ–70μ. Thickness intima vein, 37.5μ. Wall of artery, 20μ–30μ. (x 137.)

6. Five sections farther back. Showing reticulated structure of proliferated intima under higher power. (x 215.)

7. Fifteen sections farther back. The proliferated intima has taken on a finely fibrillated structure. Lumen of vein almost obliterated. It still contains serum only. Diameter lumen of vein, 20μ. Thickness of intima, 50μ. (x 137.)

8. Three sections farther back. Lumen of vein no longer visible, but its endothelial lining can still be made out. (x 137.)

9. Six sections farther back. Lumen of vein completely obliterated by proliferated intima. (x 137.)

10. Eight sections farther back. The intima again shows a reticulated structure. The obliteration of the lumen was here probably secondary to collapse of the vein. (x 137.)

11. Twenty-two sections farther back. The lumen of the vein is now probably of almost normal size, but is completely collapsed. The apparent increase in the number of nuclei in the vein wall is not pathological but is due to its collapsed and distorted condition. (x 137.)

Case 2.

12. Nineteen sections behind base of optic excavation. Lumen of vein, 11.50μ, narrowed by proliferated intima which here has a reticulated structure. On one side is a collateral, containing serum and leucocytes, which enters the intima of the vein but does not communicate with the lumen. (x 195.)

13. Thirteen sections farther back. The single lumen is replaced by three smaller lumina, each lined by endothelium and containing blood. The original lumen is on the left. The other two have been formed by the undermining of the intima by the collateral shown in Fig. 12. In one place there is a break in the wall between two of the lumina. Numerous leucocytes adhere to the walls of the lumina. (x 195.)

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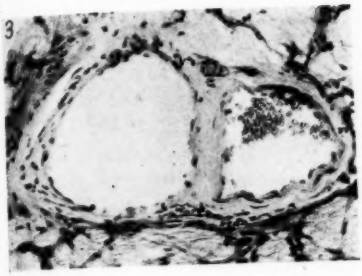

FIG. 3.

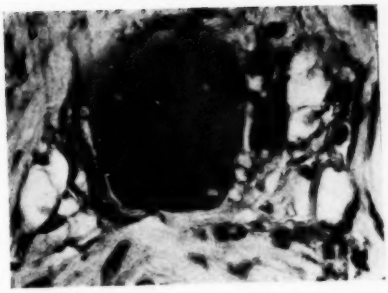

FIG. 6.

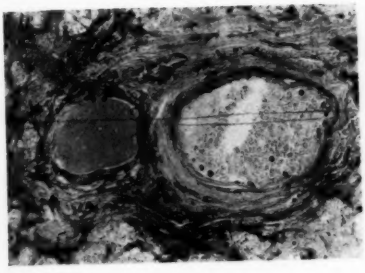

FIG. 4.

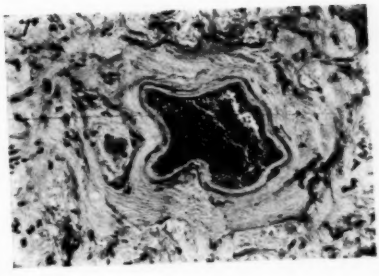

FIG. 7.

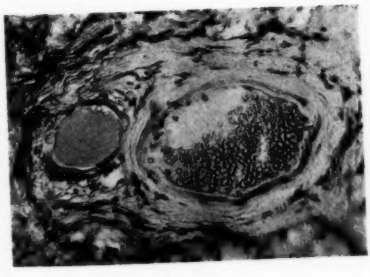

FIG. 5.

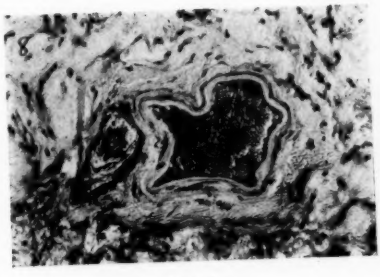

FIG. 8.

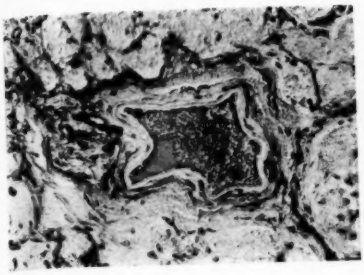

FIG. 9.

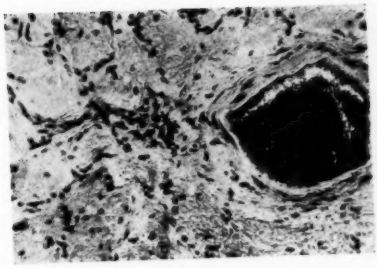

FIG. 11.

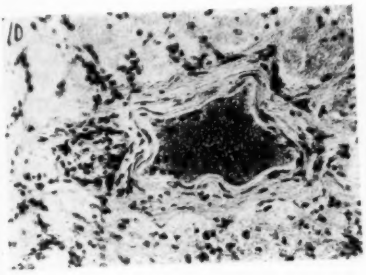

FIG. 10.

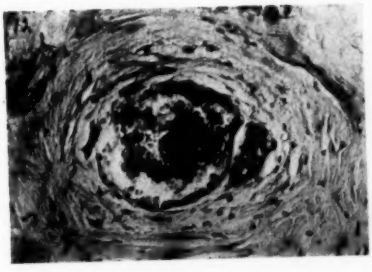

FIG. 12.

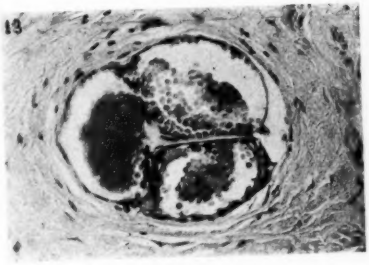

FIG. 13.

Thrombose der Vena centralis Retinæ und Ectropium Uveæ. *v. Graefe's Arch. f. Ophthalm.*, 1892, xxxviii., 3, p. 191.

4. WAGENMANN. Anatomische Untersuchungen über einseitige Retinitis haemorrhagica mit Sekundärglaukom. *v. Graefe's Arch. f. Ophthalm.*, 1892, xxxviii., 3, p. 237.

5. TÜRK. Bemerkungen zur Kasuistik der Thrombose der Vena centralis Retinæ und anatomische Untersuchungen eines neuen Falles. Deutschmann's *Beiträge z. prakt. Augh.*, 1896, Heft 24, p. 45.

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7. GOH. Beitrag zur Kenntnis der Augenveränderungen bei septischen Allgemeinerkrankungen. *v. Graefe's Arch. f. Ophthal.*, 1897, xliii., 1, p. 147.

8. REIMAR. Ueber Retinitis haemorrhagica in Folge von Endarteritis proliferans mit mikroscopischer Untersuchung eines Falles. *Arch. f. Augenheilk.*, 1898, xxxviii., p. 209.

9. PURTSCHER. Beitrag zur Kenntnis der spontanen Bindegewebsbildung in Netzhaut und Glaskörper (Retinitis prolif., Manz) nebst einem nebenblick auf die Aetiologie des haemorrhag. Glaukoms. *Arch. f. Augenheilk.*, 1896, xxxiii., Erganzungsheft, p. 1.

10. BANKWITZ. Beitrag zur Kenntnis der einseitigen Retinitis haemorrhagica. *v. Graefe's Arch. f. Ophthal.*, 1898, xlv., 2, p. 384.

11. GONIN. Deux cas d'obstruction des vaisseaux de la retine avec examens ophtalmoscopique et anatomique. *Arch. d'ophtalm.*, 1903, xxiii., p. 219.

12. MICHEL. Ueber die anatomischen Ursachen von Veränderungen des Augenhintergrundes bei einigen Allgemeinerkrankungen. *Deutsch. Arch. f. kl. Med.*, 1878, xxii., p. 439.

13. MICHEL. Ueber Erkrankungen des Gefasssystems der Arteria und Vena centralis Retinæ mit bes. Berucksichtigung der patholog.-anatom. Veränderungen. *Zeitschr. f. Augenheilk.*, 1899, ii., p. 1.

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15. YAMAGUCHI. Ein Beitrag zur Pathologie des Sehnerven bei Hirnerkrankungen. 1. Rezidivierende Stauungspapille mit Thrombose der Vena centr. Retinæ bei Sarkom des Stirnhirns. *Klin. Monatsbl. f. Augenheilk.*, 1903, Beilageheft, p. 180.

16. COATS. Thrombosis of the Central Vein of the Retina. (Four cases.) *The Royal London Ophthalmic Hospital Reports*, 1904, xiv., p. 62.

———. A Case of Thrombosis of the Central Vein Pathologically Examined. *Trans. Ophthal. Soc. United Kingdom*, 1904, p. 161.

17. SIDLER-HUGUENIN. Abhebung des Endothelrohres in der Zentralarterie und kanalisierter Thrombus in der Zentralvene unter dem klin. Bilde der Venenthrombose verlaufend. *Arch. f. Augenheilk.*, 1904, li., p. 27.

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kungen im Gebiete der Arteria und Vena centralis Retinæ und ihre Folgen für die Cirkulation mit besonderer Berucksichtigung des sog. hämorrhagischen Infarktes der Netzhaut. *v. Graefe's Arch. f. Ophthal.*, 1905, lxi., 1, p. 1.

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A DISSECTING SPATULA.

By Dr. OTTO LANDMAN, Toledo, Ohio.

(With one figure in the text).

ITS general usefulness and ease of manipulation lead me to describe the instrument and its application. The instrument is of the usual length; the blade is 25*mm* long, narrows slightly toward the tip, and is 5*mm* wide. It is stiff and yet flexible enough to yield to pressure. It is curved slightly on the flat making it more efficient. The blade is thin thus furnishing edges which will not cut but will readily serve for dissection.

A few conditions in which it has been used will be mentioned.

In **evisceration** after the conjunctiva is cut circularly around the cornea, the conjunctiva is readily separated by passing the spatula under it in all desired directions. The cornea is cut away in the usual manner and the sclera is grasped in forceps at any convenient point. The spatula is slid between the ciliary body and the sclera and is gradually passed backward between sclera and choroid, lifting the latter off of the sclera by sweeping the blade around the entire concavity of the eyeball. It separates the venæ vorticosæ easily although they are firmly united to the sclera.

In **pterygium operations** after detaching the apex from the cornea with a knife, the growth and conjunctiva can easily be dissected off. In the "McReynolds" operation, the conjunctiva above the upper border of the growth and the conjunctiva of the lower pocket are quickly separated by merely passing the blade beneath the tissue.

In **advancement of a muscle,** the conjunctiva is readily freed by means of the spatula.

In **separating cysts** from the surrounding tissue it dissects without cutting and if the cyst wall be seized by a Péan's forceps, the spatula will enable one often to remove the cyst without rupturing its wall. In one case of a **dermoid of the orbit** it was of excellent service.

In a **deep-seated cystic tumor of the orbit** it proved extremely useful. With the finger as a guide the tumor was located, the spatula was passed in and around the cyst, freeing it entirely from the adherent surrounding tissue, without rupturing its walls. In short this instrument can be used on the eye or the orbit when any blunt dissection is to be made.

It is manufactured by E. B. Meyrowitz, 104 E. 23d St., New York.

ENUCLEATION OF THE EYE WITH COCAINE ANÆSTHESIA; SUBJECTIVE SENSATION ON SEVERANCE OF OPTIC NERVE.

By Dr. EDWARD KEITH ELLIS,

Boston, Massachusetts,

AND

Dr. HENRY GLOVER LANGWORTHY,

Dubuque, Iowa.

SOON after the advent of cocaine in ophthalmic surgery in 1884, this anæsthetic was used in enucleation of the eyeball by different men, both in this country and abroad, with varying degrees of success. From that time until the present, articles have appeared in the medical journals occasionally, reporting cases where it has been used.

The first instance of its having been done in this country, found on looking over the literature for the past twenty-seven years, is the case published by D. C. Cocks.[1] His patient was operated upon November 29, 1884. A solution of cocaine was dropped into the conjunctival sac every three to five minutes while the operation lasted, which was one-half hour.

The usual circumcorneal incision was made in the conjunctiva, dissecting the tissues back, and injecting the solution as fast as dissection proceeded, with an Anel syringe having a small needle. The operation was

[1] D. C. Cocks, *The Medical News*, Philadelphia, 1884, xiv., p. 654.

completed, cutting the optic and ciliary nerves, with very slight discomfort to the patient.

In 1886 A. D. Williams [1] reported a case similar to the one above given. This was followed by two separate publications in the London *Lancet;* the first by Tosswill, Bankart, and Roper,[2] in which were published the records of seven cases in which this method was employed, and the second by C. L. Lightfoot,[3] in which the same thing was done.

In these cases a 10% solution of cocaine was dropped in the eye, the dissection of the conjunctiva proceeding as usual, until the ocular muscles were reached, when a 4% solution was injected along each one of them. The operation was then completed with no more discomfort to the patient than that produced by the ordinary tenotomy and advancement of the ocular muscles.

"Ossification of a degenerated choroid in an atrophied stump threatening sympathetic ophthalmia. Enucleation under cocaine; history of case," is the title of a paper published in 1889 by J. A. Campbell.[4] The same method was followed here with a good result.

Edward Jackson [5] of Denver reported the operation by the same method in two cases. In the first case the eye was very hyperæmic, and anæsthesia was rather incomplete. In the second case the eye was free from hyperæmia, and the operation was completed with no worse discomfort than that experienced in tenotomy of the ocular muscles. A 4 to 10% solution of cocaine was used,—at first injected, and later simply dropped on the conjunctiva.

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[1] A. D. Williams, *St. Louis Medical and Surgical Journal*, 1886, li., 17.

[2] Tosswill, Bankart, and Roper, *London Lancet*, 1888, i., 172.

[3] C. L. Lightfoot, *London Lancet*, 1888, i., 824.

[4] J. A. Campbell, *Journal of Ophthal., Otol., and Laryngol.*, 1889, i., 60–65.

[5] Edward Jackson, *Annals of Ophthalmology and Otology*, Kansas City, 1892, i., 7.

In 1892 Armaignac [1] described this method in an article entitled "De l'anesthésie locale par la cocaine dans l'enucléation du globe oculaire." Another publication by the same author [1] appeared in 1893. A 3% solution of cocaine was used at the start, and later a 10% solution. Injections were used.

During the same years appeared an article by J. Dunn,[2] in which he states that for the three years previous to 1893 in the Richmond Eye and Ear Infirmary cocaine anæsthesia was used in all enucleations except those in young children and where panophthalmitis was present. A 4% solution was used before the conjunctiva was cut. The solution was then injected under it with the ordinary eye-dropper, and after waiting two minutes the tendons of the ocular muscles were severed without pain. A 20% solution was then applied about the entrance of the optic and ciliary nerves to the globe, and the operation completed.

In an article entitled "De l'enucléation avec anesthésie locale; indications et technique," F. Terrien[3] has described the method as performed by him. He first gives a subcutaneous injection of 1 centigram of morphia. After waiting a few minutes he instills cocaine into the conjunctival sac and soon begins the operation. When the muscles are reached, cocaine is injected along their course through a small curved Anel needle. On reaching the optic nerve the following solution is injected about its entrance:

Hydrochlorate of cocaine Hydrochlorate of morphia	aa	.01
Stovaine Sodium chloride	aa	.02
Distilled water		5.

[1] Armaignac, *Jour. de méd. de Bordeaux*, 1892, xxii., 101–103.
[2] J. Dunn, *Virginia Med. Month.*, Richmond, 1892–3, xix., 959.
[3] F. Terrien, *Arch. d'opht.*, Paris, 1906, xxvi., 84–90.

One cubic centimetre of this solution is used. The nerve is then cut with but slight discomfort.

It is probable that most observers have found that more discomfort is experienced in those cases where there is an active hyperæmia. In these cases it seems a good plan to use a 1 or 1/2% solution of holocain, since this drug acts better on inflamed tissue than cocaine.

The following cases illustrate the patient's sensations during the operation:

CASE 1.—*Enucleation; cocaine anæsthesia; subjective sensations on nerve division.*

July 7, 1905, there was admitted to the Massachusetts Charitable Eye and Ear Infirmary on the service of Dr. F. E. Cheney, a man aged seventy-two years. Occupation, ex-watchman. Past history: Ten years ago vision began to fail in the left eye. For a long time he was able to distinguish objects above the horizontal line of vision much better than those below. All vision completely lost for eighteen months. He has never had any trouble with the right eye.

Present Ocular History: Severe pain in the left eye for past three weeks. Pain is sharp and neuralgic in character, radiating down to the teeth and through the forehead.

Ocular Examination: Right eye white and quiet; apparently normal. Left eye, vision nil. Great injection with slight chemosis of conjunctiva. Cornea cloudy, with small spots seen on posterior surface below the median line. Anterior chamber very shallow. Pupil small and does not react. Fundus not seen. Tension + 2. Slight divergence and hypertropia. The whole globe projects forward about 3/8 of an inch. Movements of globe are not restricted. Tissues about globe are soft, and upon palpation give the feeling of perhaps more than the normal amount within the orbit. For the next thirteen days the pain was severe in spite of treatment. Treatment consisted of pilocarpine, (1% solution) three times a day, with fomentations every 4 hours. There being a continuation of the severe pain, and the exophthalmos conveying the impression that

there might be some new growth in the orbit, it was decided best to enucleate the eye.

The patient was very desirous of having the operation performed under the influence of cocaine, if possible, feeling that his heart could not withstand ether, and although no lesion was found upon examination, his request was granted.

Operation: A few drops of a 1/2% solution of cocaine was injected deep into the orbital tissue along the four recti muscles, with a curved hypodermic needle, after thoroughly anæsthetizing the conjunctiva with a 4% solution dropped at intervals of two minutes, into the conjunctival sac. The globe was then enucleated in the usual manner. No discomfort was experienced until the optic nerve was severed, and then only a very slight amount of pain was felt on the instant. There was no sensation of light, due to the fact that the nerve was atrophied. The only sensation experienced was when the nerve was cut, when the patient thought "that a piece of bone must have been included with the tissues between the blades of the scissors," as he expressed it.

The after treatment was as usual with any enucleation. No sign of a new growth was found. The patient felt no worse discomfort than that experienced on extraction of a foreign body from his cornea, as he said. He was so much interested in the whole proceeding, that he wished to take the enucleated globe in his fingers, to "look at the source of all his troubles."

Case 2.—Male, age thirty-one; admitted to the Massachusetts Charitable Eye and Ear Infirmary November 5, 1906, on the service of Dr. H. H. Haskell.

Past History: Patient had had a large perforating ulcer of the cornea of the left eye twenty-four years previous. He has had intermittent attacks of pain and inflammation ever since. He has been treated at the New York Eye and Ear Infirmary for attacks of irido-cyclitis, and enucleation was advised there.

Present History: For the past six months there have been redness and severe pain at intervals in the left eye. Examination of the eye showed marked injection of the ocular conjunctiva; a large corneal opacity below the centre, with the iris bulged forward and the margin of the pupil adherent to

the scar. Tension minus. Great tenderness on palpation. Vision-perception of light. Pain marked. Enucleation advised and accepted. Patient desired to forego the ordeal of ether, if possible, and the use of cocaine was suggested and met with approval.

Operation: Three applications of a 4% solution of cocaine hydrochlorate were made to the eye, and the usual method of enucleation pursued. Many adhesions were encountered, but were divided with no discomfort to the patient. The ocular muscles were divided with very slight pain. Cocaine solution was then applied on a cotton swab as far posteriorly as possible, and a small amount injected about the nerve entrance. After a moment the nerve was divided. Pain was very slight.

The patient had previously been asked to take note of his sensations during the operation. He said there was no sensation of pain or discomfort until the muscles were divided, when there was a dull aching sensation, as each one was lifted and cut. After this he was not at all uncomfortable until the optic nerve was reached. When this was divided there was a dull crushing sensation (but no worse than a toothache), which was gone instantly. Simultaneously there was a slight flash of white light, succeeded instantly by total darkness.

The discomfort experienced during the operation was very slight,—especially so as compared with the knowledge of what was taking place. The idea of being conscious during the proceeding, and feeling the hemorrhage on the side of his face was the one terrifying thing about it, and not, he said, the discomfort produced by the operation itself, which was very slight.

Case 3.—A boy, aged twelve, was admitted to the Massachusetts Charitable Eye and Ear Infirmary November 16, 1906, on the service of Dr. H. H. Haskell.

Two months previous he was kicked by a horse over the right eye. Vision had been slowly lost. There had been no pain.

Examination showed in the right eye a scar extending across the whole cornea and sclera, out over the external canthus into the skin about the temple. The scar was about two inches long. The globe had been perforated, as was evidenced by the fact that the iris was adherent to the scar

in the cornea across its whole extent. Slight ocular injection. Tension minus. Vision = perception of light. Enucleation advised and accepted.

The question of ether or cocaine anæsthesia arose, and the boy wished to try the latter.

Operation: Three applications of a 4% solution of cocaine hydrochlorate were made to the eye and the operation proceeded in the usual manner. No pain was experienced until the ocular muscles were lifted and divided, and here the pain compared with that experienced during any tenotomy. Cocaine was then applied on a cotton swab as far posteriorly as possible in all directions, and a small amount injected with a hypodermic needle about the ciliary and optic nerves, as was done in the other cases. After a moment the nerve was divided, and, as before, there was very little discomfort.

The subjective sensations as outlined by the patient of his own accord were as follows: No discomfort until the ocular muscles were divided. Then there was a dull dragging sensation. No more pain until the optic nerve was reached and divided, when he felt a sudden crushing sensation, which, although far from being pleasant, was not particularly painful. At the same time he perceived a sudden flash of white light which was instantly dispelled, and succeeded by total blackness. As the blades of the scissors were introduced around the nerve, the patient perceived "little points of light," due probably to rubbing the nerve with the blades of the scissors as they passed by it. He insists that he would go through the same experience again if it were necessary, rather than be etherized.

CONCLUSIONS.

In many cases where there is a great fear of ether anæsthesia on the part of the patient, it seems perfectly justifiable to enucleate under the influence of cocaine. This can be easily and very nearly painlessly done, especially if the patient is an intelligent one. From the results of the cases above cited it would seem that in the majority of simple enucleations, ether, with the sense of suffocation that accompanies the administration of it, and

the nauseating effects that generally follow it, is a rather unnecessary hardship. Of course, barring the disagreeable accompaniments of ether, there is nothing better than complete general anæsthesia for a surgical procedure of this kind, but in most cases cocaine anæsthesia will answer all purposes, since what little discomfort there is, is more than compensated for by the absence of the after effects of general anæsthesia.

In highly inflamed conditions of the eye, cocaine does not act as well, and here, as above stated, a 1% solution of holocain may be used instead, since holocain acts better than cocaine on inflamed tissues.

In very young patients the use of ether for obvious reasons is imperative, but later in life local anæsthesia works perfectly well. The solution for injection about the posterior portion of the globe, recommended by Terrien, seems to be an admirable mixture, and his method of first injecting morphia subcutaneously is a useful addition.

A CASE OF METASTATIC CARCINOMA OF THE IRIS.

By F. I. PROCTOR, A.M., M.D., Boston.

PATHOLOGICAL EXAMINATION.

By F. H. VERHOEFF, M.D., Boston.

METASTATIC carcinoma of any part of the eye is comparatively rare. As is well known the metastases are most frequently situated in the choroid, about forty such cases having been reported. Three cases have also been reported in which the metastasis occurred in the ciliary body. The following case, however, in which the iris was the only part of the eye attacked, seems to be the only case of its kind on record.

Mrs. M., seventy-two years of age, consulted me June 27, 1905, in regard to a small spot on the iris which had been first noticed by her daughter two weeks earlier. She appeared to be in good health, but had some slight pain in the abdominal region which she attributed to indigestion. The only point in her previous history bearing on her case was the fact that in 1903, Dr. Abbe of New York had removed a tumor of the breast. Both Mrs. M. and her daughter had the impression that this tumor was not malignant, but Dr. Abbe has since written that it was a carcinoma.

The spot on the iris was situated directly above the pupil and a little nearer to the pupillary border than to the ciliary region. In shape it was an irregular oval with its major axis horizontal. It was about *3mm* long and *2mm* wide. Its anterior surface projected slightly beyond the plane of the

iris and there were several coral-like excrescences on the anterior surface, of varying size, but the longest not more than *1/2mm.*

There was a fairly sharp line of demarcation between the tumor and the surrounding tissue. The color of the tumor was grayish-brown, considerably lighter than the surrounding dark brown iris. The projections on the anterior surface were grayish-white. The iris reacted normally. There were no inflammatory symptoms. Vision was normal. No changes in fundus.

In view of the history of tumor of the breast (presumably malignant) and the fact that the patient had no vision in the other eye (there had been some inflammatory process many years before resulting in total loss of sight), the condition appeared so serious that I advised a consultation with Dr. Wadsworth. He examined her the same day and telephoned me that he thought it best to watch the case, await developments, and see if the growth increased.

I then sent Mrs. M. to Dr. H. F. Vickery, to ascertain if there were evidences of metastases elsewhere. At this examination he found nothing to indicate metastasis, but two months later he felt distinct nodules in the upper part of the abdomen, which he thought were either in the mesenteric glands or the liver.

July 7th I saw the patient again and found no change in the size or appearance of the tumor.

I next saw her July 17th, three weeks after her first visit, and noted that the growth had increased slightly, but I did not feel that it warranted operating, so I left Boston with the understanding that she should see Dr. Wadsworth ten days later, and if he found the tumor growing I would return.

July 28th Dr. Wadsworth wrote as follows: "I find the growth has increased (horizontally) from *3mm* June 27th to *4mm;* its surface has become more sessile and changed in color, where there were one larger and several smaller whitish projections from the anterior surface, now the whole surface is irregular, whitish with reddish tinge, as from minute blood-vessels. There seems no special change in the posterior surface of the growth. V. with + 2.00 D. = $\frac{2}{1\frac{0}{0}}$. No change. Fundus normal.

"I have advised, in consideration of the continued growth, that on the whole it is best to have an operation, and if it is to be done, the sooner it is done the better."

I returned at once and found the patient's general condition much worse. She had lost flesh, had constant pain in the upper abdomen and took little nourishment.

August 1st, seven weeks after the date when the tumor was first noticed, I removed it under cocaine. The operation was attended with considerable difficulty. I wished to remove the growth with one cut of the scissors, if possible, as I feared that otherwise it might be obscured by hemorrhage and its extirpation then rendered more difficult.

The first attempt was to seize the tumor itself, but the tissue was so elastic that this was unsuccessful. Finally I was obliged to make a broad iridectomy, including not only the tumor but a generous piece of iris on either side. The iridectomy was carried back as far as possible, as in an operation for glaucoma.

The hemorrhage was insignificant. The subsequent healing was uneventful and after two weeks the patient was using her eye as usual. Her general condition, however, grew steadily worse and she died Sept. 16, 1905.

PATHOLOGICAL EXAMINATION.

(*From the Pathological Laboratory of the Mass. Charitable Eye and Ear Infirmary.*)

The specimen submitted for examination consists of a small piece of iris tissue containing a tumor *6mm*, *2mm*, *3mm* in size. The tumor is white in color, firm, and its surface shows minute lobules. The specimen was fixed in formalin, but through a mistake was previously allowed to remain in water for about twenty minutes so that the fixation was imperfect.

On microscopic examination the tumor is found growing entirely within the stroma of the iris. The growth has no capsule and at its periphery is not sharply marked off from the normal tissue but irregularly infiltrates the latter. The lobulated appearance noted microscopically is no doubt due to an exaggeration of the normal markings of the iris. In

the main body of the growth the tumor cells are closely packed together, and all that remains of the iris stroma are its blood-vessels and a few strands of connective tissue radiating from them. Only a few pigmented stroma cells are to be seen. The pigment epithelium on the posterior surface of the iris is intact. Some of the sections show the sphincter pupillæ surrounded by tumor cells and partially invaded by them. The tumor shows no infiltration with inflammatory cells.

The tumor cells are large and fairly uniform in size. They are greatly swollen, due no doubt to the osmosis resulting from their exposure to water, and their cytoplasm is almost transparent, probably from the same cause. Owing to this transparency, the cell membranes are seen with great distinctness so that most often it appears as if the nuclei were situated in a network of reticulum. The nuclei all stain diffuse, owing no doubt to the solution of the chromatin by the water, but the nucleoli are well preserved. Occasionally the cells seem to be grouped about a lumen or to line a tissue space, but this is difficult to determine on account of the poor fixation. The cells can not be found growing over the surface of the iris in the form of columnar epithelium.

The most striking feature of the growth is the extraordinary abundance of mitotic figures. As many as twelve of these can usually be seen in a single field of the high-power dry lens, and they stand out with especial distinctness owing to the clear background afforded by the transparent cytoplasm.

PATHOLOGICAL DIAGNOSIS: METASTATIC CARCINOMA OF IRIS.

Remarks.—That the tumor is highly malignant is clearly indicated by the abundance of mitotic figures and also by its infiltrating character. Its exact nature is less easy to recognize from the histological examination, owing largely to the poor fixation, but yet can be determined within a high degree of probability. In the first place a sarcoma of the same size would be encapsulated, would not so extensively infiltrate the iris stroma, and would not display such an abundance of mitotic figures. More-

over, its stroma would be more abundant and would show a more definite arrangement. Granting that the tumor is a carcinoma, its metastatic origin is shown by the fact that it does not arise from the pigment layer, the only epithelium connected with the iris, and also by its infiltrating character. As a matter of fact, the clinical history, obtained later, leaves no doubt of the correctness of the diagnosis.

A CASE OF BILATERAL, SLOW, PAINLESS HYPERTROPHY OF THE LACHRYMAL, PAROTID, SUBMAXILLARY, AND SUBLINGUAL GLANDS, ACCOMPANIED BY MARKED AND PROLONGED GENERAL SYMPTOMS.

By Dr. JOHN DUNN, Richmond, Va.

(*With two photographs on Text-Plate IV.*)

In June, 1903, Alberta, aged thirteen, a full-blooded negro girl, had parotitis which apparently subsided in a few days. About the middle of October "both upper eyelids began to swell"; five weeks later "the skin in front of both ears" did likewise. When first seen, Dec. 7, 1903, (*vid.* photo, Fig. 1, Text-plate IV.) the following conditions existed. Marked swelling of both upper eyelids and of both parotid regions. Palpation of the lids shows the swelling to be caused by excessively enlarged lachrymal glands, which extend above the ball two-thirds of the way to the inner canthus, the individual lobules of the gland feeling much like large shot; indeed, the whole gland seemed to the finger to be made up of a mass of buck-shot. Partial eversion of the lid showed the mucous membrane over the lower part of the gland to be excessively red, resembling raw beef. There was, however, no secretion from the gland, nor did any visible secretion of tears occur if the finger was rubbed over the conjunctiva. There was no congestion of the ocular or palpebral conjunctiva elsewhere than in the place above mentioned; no secretion of inflammatory mucus. The patient had no sensation of uncomfortable dryness about the eye or nose, and yet the conjunctiva was visibly dryer than normal. The lachrymals were in no sense painful, either subjectively or on manipulation.

The eyes feel more puffed in the morning than in the after-

ILLUSTRATING DR. DUNN'S ARTICLE ON "GLAND HYPERTROPHY."

FIG. 1.

FIG. 2.

noon, and at the former time feel "stickery." There was nothing else abnormal to be noted about the eye or ocular region. The parotids were likewise greatly enlarged in all parts and gave the same divided shot-like feel as the lachrymals. There was no secretion from them. Their ducts could be probed without producing the slightest output of saliva. The sublingual and submaxillary glands were in similar conditions. The patient was slightly annoyed by a "dry mouth," and was constantly thirsty. She suffered no pain from any of the swellings. Temperature, pulse, breathing normal. Proportion of white to red corpuscles 1–500, with simple anæmia. The only discomfort of which the patient complained was a pain in the stomach, a pain for which I could find no cause.

Being unable to get any suggestions as to treatment from any of the medical books at my command, I gave the girl 1 gr. of blue mass every two hours during the day until the first tendencies of salivation appeared, which happened in a few days. The glands grew slowly larger. I next gave the iodide of potash in gradually increasing doses, but without effect. The glands continued to grow. Arsenic was next tried; this, too, failed to produce any visible result. On January 6, 1904, the only changes visible were the considerable increase in the size of the swellings and the diminution in the weight of the patient. None of the glands were as yet painful to touch, or gave any evidences of fluctuation. The temperature remained normal.

There had within the last day or two appeared a patch of herpes in the upper lip just below the nose. The swellings were very much larger than on Dec. 7th; especially noteworthy was the increase in size of the submaxillary and sublingual glands.

Jan. 19, 1904, apparently no change since Jan. 6th. Blood examination made at this time was negative. Examination of the stomach contents revealed no cause for the "pains in the stomach." There was no ovarian tenderness; no demonstrable splenic or hepatic disease; no vaginal disease; no enlarged lymphatic glands. Iron, arsenic, mercury, potash, etc., were used in full doses and without effect on the progress of the swellings which continued to increase in size.

About June 1st patient disappeared and was not seen until July 21, 1904, when I looked her up to find that on June 2d she had been taken with "weakness in the legs," and had not since been able to come to my office. At this time, July 21st, there was still further marked enlargement of all the glands, which were now enormous; the parotids were so swelling out their region as to greatly disfigure the face. There was no evidence of acute inflammation; no tenderness on pressure, or subjectively. Patient had temperature at 2 P.M. of 101° F. She complained of nothing but "weak spells in her legs" which kept her from walking.

July 20, 1905.—Patient remained in bed with fever for several months. Since then health has been continuously poor.

Status præsens: 11 A.M., 101° F. Patient can give no idea as to how long her fever has lasted, but there has been no time since she became ill in June, 1904, that she has felt free from fever. Skin shows epithelial disturbances over both parotid regions. At a little distance, skin looks glazed; examined more closely there seems to be a thickening of the dermis with raising of the epidermis; has headache at times; voice hoarse and weak. Patient is strong enough to come by street car two miles to office. Hypertrophy of all the salivary and lachrymal glands still present and very marked; the shot-like, separate feeling of the individual lobules, however, has largely given way to a "solid mass" sensation. The shotty feel of the lachrymals still persists. Nose has been "stopped up" for months—cartilaginous septum shows a thickened superficially ulcerative condition, highly suggestive in appearance of syphilitic infiltration of the septum. A thin mucous discharge flows from the nose. Hoarseness, which has existed for some weeks, is sub-glottic (as shown by mirror). Pharynx and naso-pharynx normal. Conjunctiva slightly congested along the cul-de-sac, is otherwise normal. Lymphatic glands of neck enlarged—epitrochlear enlarged. Inguinals enlarged. No splenetic enlargement. Patient has no enlargement of mammæ. No epistaxis. Is much emaciated.

Sept. 19, 1906.—Patient has been seen at intervals of two or three weeks, or oftener, for the past year. The tem-

perature has been taken at each visit, and has always been found to be from a degree to two degrees above normal; her health until the past two weeks has been so poor as to suggest tuberculosis, and yet no evidence of this disease can be found anywhere, although the patient has been repeatedly examined. The extensive superficial ulceration of the septum has healed, and this without any intranasal applications. The inflammation of the skin which in July, 1905, was confined to the regions over the parotid has gradually extended until it meets over the bridge of the nose; its character is in all respects identical in appearance with that presented by the disturbance when it was more limited in extent. This skin eruption has been accompanied by no unpleasant subjective sensations.

On this date, Sept. 19, 1906, the patient looks better in health than at any time since her illness began, now over three years ago. On the face the line of demarcation between the diseased and healthy skin is clearly marked (*vid.* photo, Fig. 2, Text-plate IV.) and apparently the eruption is subsiding. Tongue is now moist and so is the conjunctiva.

Nov. 1, 1906.—On the face the skin eruption has disappeared as an active process. It has, however, left behind it atrophy of certain of the layers of the skin, the whole area of inflammation being clearly demarcated by a thin depressed scar with a more or less glazed surface. Patient is now free from fever and her general condition good. There remain no traces of the intranasal ulceration. There is no cough. There remains no enlargement of the cervical or inguinal-lymphatic glands. There is no visible hypertrophy of the lachrymal or parotid glands. The flesh over the parotids is abnormally flat as though the parotids had atrophied. In the submaxillary and sublingual glands there can still be felt a few hardened lobules.

In considering the above history two questions present themselves in front of a host of others. Are we dealing here with a case of chronic mumps, *i.e.*, an infectious disease of the salivary glands, or have we to do with a case of chronic systemic poisoning due to entrance into the circulation of substances which are normally excreted by

the lachrymal and salivary glands and pass thus out of the body? If the latter, then the case should be termed one of salivism and belongs to the same class of diseases as thyroidism, where it seems fairly well established that the exophthalmos, the cardiac, intestinal, cutaneous, febrile, and other symptoms are the result of entrance into the circulation of certain substances elaborated by the diseased thyroid gland, the cause of the disease being entirely unknown. Mumps is an infectious disease of limited duration; is manifested by swelling of the parotid glands, accompanied by pain and fever; from time to time the other salivary glands and lachrymals are also affected. Its effects upon the ovaries, testicles, and inner-ear structures are well known. In the case above reported, mumps affecting the parotids alone occurred early in June, 1903, and, according to the patient, every symptom disappeared within a few days after the disease set in.

About four months later the lachrymal, parotid, and other salivary glands began their *slow*, *painless*, and, at first, *afebrile* hypertrophy. The secretion through the salivary ducts ceased with the beginning of the hypertrophy and has never been re-established. Some months later the patient was taken down with a fever which lasted for over two years. The symptoms accompanying the fever were unlike those of any of the classified febrile diseases.

In connection with the fever there was "a weakness in legs." The patient became emaciated and lost appetite and physical strength to such an extent that for several weeks she was forced to keep to her bed, being unable to walk, and death seemed imminent. During this time I saw her once and found no symptoms of typhoid fever or malaria. Gradually her strength returned although for more than a year she could get about only with great difficulty. Medicines seemed in no way to affect the course of the disease.

Knowing how common syphilis is among the negroes of the South, mercury and potash were tried without effect. Arsenic and the usual tonics did not seem to in any way affect the fever or its accompanying symptoms. Save that a simple anæmia existed, examinations of the blood revealed nothing. There was no enlargement of the liver or spleen; no persistent diarrhœa. There was no demonstrable ovarian trouble. Menstruation, which normally occurs early in the negro race has not yet appeared. The background of the eyes was normal. Hearing normal. Brain clear. There was for a long time "a pain in the stomach" to the interpretation of which repeated examinations (including examination of the stomach contents) gave no clue. For some months in the third year there were hoarseness and a cough. The former was due to subglottic congestion, the congested area being clearly visible in the laryngoscopic mirror. The cough probably had the same origin, for the lungs remained normal. There was never any expectoration. Both hoarseness and cough have disappeared without treatment. There was never any abnormal enlargement of the faucial or post-nasal tonsils. There has never been one symptom distinctively tuberculous or syphilitic.

During the third year there appeared along with the cutaneous inflammation an ulcerative condition of the mucous membrane over the cartilaginous, and possibly also over a part of the bony septum, and some lymphatic enlargement. This ulceration and skin eruption disappeared without treatment; the former leaving no trace of its previous existence, the latter leaving an atrophy of the part of the skin affected. The disappearance of the symptoms of the disease kept pace with the lessening in the size of the hypertrophied glands. The indications are that the gland structure in the lachrymals, parotids, etc., has atrophied, being replaced by new-formed connective tissue.

These symptoms taken together seem to point to the

existence of a disease which is to be classed along with thyroidism, except that we have to do in the latter case with a ductless gland. We have here to do with a disease whose symptoms are not due to microbic action but to the effect upon the system of substances elaborated and returned to the circulation instead of being excreted by their proper channels. And I would suggest the term salivism as not inappropriate to describe the condition.

How far these views will eventually be found to hold good, I am unable to predict. I have had in my practice no similar case. A considerable number of cases of bilateral hypertrophy of the lachrymal and salivary glands have been reported since Mikulicz's article was written in 1892. To none of these reports have I access save two or three, and these are merely descriptive of conditions existing at the time the articles were written, not detailed descriptions of the general symptoms as they varied from month to month.

I found no drug which, so far as I was able to see, in any way influenced the course of the disease. The trouble occurs so infrequently that it will probably be a long time before an anti-serum produced from the salivary glands along the same lines as that produced from the thyroid by Drs. Beebe and Rogers, and used by them in the treatment of thyroidism, will be available for experimental purposes. And even then, until the cause is known, such an anti-serum would be of only limited value.

A CASE OF CONGENITAL STAPHYLOMA OF THE CORNEA.

By Dr. JOSEF RUNTE of Würzburg.

Translated from Vol. XLVIII. of the German Edition, July, 1903, by Dr. Matthias Lanckton Foster.

(With three illustrations on appended Plates IX. and X.)

THE following case seems to be worthy of record because of its rarity:

An infant was found to have a staphyloma of the right cornea on the day of its birth, ulceration appeared three days later, and on the following day the eye was enucleated. Both parents were perfectly healthy, the labor had been not unusually long and without accident. Except for some conjunctivitis which was not blennorrhœal in character the left eye appeared to be perfectly normal.

The enucleated eye was fixed in formol and then hardened in alcohol.

Macroscopic Examination. — A fairly well marked furrow divided the eye into a posterior and an anterior portion. There were no pathological changes to be seen in the posterior part, but anteriorly the cornea had been replaced by a protruding, globular, whitish tissue. The measurements of the enucleated eyeball were:

Longitudinal diameter of the entire eye 22 1/2*mm.*
" " " scleral portion 14 1/2*mm.*
" " " staphylomatous portion 8*mm.*
Transverse diameter of posterior portion 14*mm.*
" " " anterior portion, 9 *mm.*

The posterior part of the staphyloma, through which

some pigment could be discerned, was thinner and less opaque than the anterior portion. Its top was thicker and more swollen than the periphery, was of a brownish white color, and had an uneven and ulcerated surface. The action of the alcohol on the eye had caused two dimples to appear in the staphylomatous portion.

The eyeball was then embedded in celloidin and divided horizontally.

No normal corneal tissue could be seen. The staphylomatous tissue was for the most part of irregular thickness, its posterior wall was uneven and covered with pigment, which varied in color from yellowish brown to brownish black, part of it spread out with a fair degree of regularity, part in irregular strips. Nothing beside this pigment could be seen of the iris. The lens was of normal size, luxated forward and laterally so as to lie near the ciliary body, which exhibited some collections of pigment. The ciliary processes were pretty well developed on one side, were long and reached somewhat obliquely forward in the form of little ledges, but on the opposite side they were short and small. The ciliary muscle could not be seen. The sclera was slightly thinned at the place where the lens lay and in front of it in the neighborhood of the ciliary body, and a little thickened at the corresponding place on the opposite side, but elsewhere it was of normal thickness. Nothing pathological could be seen in the choroid, which lay smoothly on the sclera, nor in the retina which had been artificially detached. The stump of the optic nerve and the papilla presented the usual appearances.

Microscopical Examination.—The entire staphyloma was very irregular. The thickness of its wall varied from 1/4 to 1*mm*. The anterior corneal epithelium was present only in places on the periphery where it lay on cicatricial tissue which ran in more or less wavy lines on the anterior surface. Its stratification was normal, but it was thickened in places and somewhat infiltrated

with leucocytes. It also contained peculiar cells, especially in its middle and anterior portions, part of them with round, part with oval, part with elongated nuclei lying for the most part excentrically, each surrounded by a bright space. All the various stages of karyokinesis could be demonstrated in the preparations stained with hæmatoxylin, a proof that the epithelium was undergoing proliferation. All that was left of the true corneal tissue appeared as a superficial layer 3 or 4*mm* in diameter about in the middle of the staphyloma. Beneath it was a firm, thick layer of coagulated fibrin pus cells which extended into the deepest layers of the staphyloma. The substantia propria was everywhere replaced by a cicatricial tissue permeated with lymphocytes. The posterior part of the cicatricial tissue was composed of numerous firm, thick connective-tissue fibres which were stained dark red in the preparations treated by Van Giesen's method, while anteriorly the connective-tissue fibres were stained bright red, but they showed marked cellular infiltration. Numerous vessels distended with blood were cut across in the tissue of the staphyloma and there were extravasations of blood between the connective-tissue fibres. No trace remained of either Bowman's or Descemet's membrane. Large portions of staphylomatous tissue protruded from its posterior wall into the posterior chamber.

In the peripheral sections was a rather large oval cyst in the midst of the staphylomatous tissue, the position of which could be recognized macroscopically as a circumscribed thickening of the cornea. By a study of the series of sections it was shown that this cyst must have been caused by a partial involution of the staphyloma and the healing over subsequently of the superficial part of the degenerated tissue. It was lined with laminated pavement epithelium which had the same structure as the remains of the anterior corneal epithelium and presented karyokinetic figures in various stages. The

posterior surface of the staphyloma was covered with pigment, completely in the peripheral sections, to a great extent in the central, but in the region corresponding to the pupil it was absent or very sparse. There were little pigment granules in the anterior layers which must have wandered there from the posterior wall. On the posterior wall was a space bordered by pigment, continuous through many slides, filled with leucocytes, which may have formed the space by their interposition between the layers of iris pigment.

No traces were to be found of Fontana's space or Schlemm's canal. The space which corresponded to the posterior chamber was filled with coagulated fibrin and leucocytes, with numerous pus cells, especially in the hollows between the above-mentioned projections from the posterior wall and in the space between the ciliary body and the staphyloma. The spaces between the ciliary processes were also filled with leucocytes. The short ciliary processes on one side were directed forward. The fibres of the zonula could be seen plainly as small threads broken from the lens and reaching into the posterior chamber on the side opposite that to which the lens was luxated. Between them were many leucocytes. The ciliary muscle on each side was poorly developed.

The shape of the lens varied on the different slides, but the change in form from the normal was probably due to the action of the formol. The lens capsule was normal, except for a wavy outline. Upon it were many leucocytes. The anterior lenticular epithelium was normal. Between the lens fibres were spaces of various sizes filled with fluid. Some of the fibres were opaque and swollen, others changed to vesicular cells. The centre of the lens was occupied by the detritus of lens fibres. The vitreous was shrunken and fibrous with a few leucocytes about its periphery. There were no pathological changes in the choroid, pigment epithelium, or retina. The layer of rods and cones was in good condition. The papilla

had no glaucomatous excavation, the central vessels were well filled with blood, and the tissue of the nerve was normal.

Krũckow in his article on "Two cases of congenital staphyloma of the cornea" collated the literature on the subject and was able to find only a very doubtful case reported by Beer, a mention by Schön of a proposed article by von Ammon, a case of Sichel's, and Crampton's report of two brothers each apparently born with a staphyloma of the left eye. Since that time several cases have been observed, the records of which can be found by reference to the appended bibliography.

It must be acknowledged to be proven that intrauterine inflammation occurs. Hippel refers many anomalies of the eye to this cause, among them total staphyloma of the cornea. It is also fairly certain that the inflammation is of a bacterial nature, because the presence of bacteria has been demonstrated in a few cases of congenital ocular inflammation. Probably they caused the inflammation in this case although their presence could not be demonstrated in spite of the use of various methods of staining. But it is hard to tell how they excite the inflammation. It is well known that the exciters of inflammation may be introduced into tissues either endogenously, through the blood, or ectogenously, through external influences. According to the investigations of Leber and Schöbl, the cornea of the embryo contains blood-vessels at no time during its development, so it is difficult to understand how it can be primarily infected through the blood. At the same time there is nothing upon which we can base a theory of external infection, and yet we have to consider the corneal affection as primary. There is likewise nothing to indicate the time when the infection can have taken place.

EXPLANATION OF THE PLATES.

FIG. 1.—*Plate IX.* Lateral view of the eyeball.

FIG. 2.—*Plate X.* Horizontal section of the eyeball.

(a) lens luxated laterally.
(b) pigment on the lens.
(c) pigment on the posterior wall of the cornea.
(d) cicatricial tissue in the cornea.
(e) retina.

FIG. 2.—*Plate IX.* Microscopic section through the staphyloma.

(a) cicatricial tissue.
(b) vessels in the cicatricial tissue.
(c) coating of pus.
(d) leucocytes.
(e) remains of the iris.

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REPORT OF MEETINGS OF THE OPHTHALMOLOGICAL SECTION OF THE NEW YORK ACADEMY OF MEDICINE.

By Dr. H. H. TYSON, Secretary pro tem.

OCTOBER 15, 1906. PRESIDENT, DR. WILBUR B. MARPLE, IN THE CHAIR.

On account of the absence of Dr. Lambert his case was presented by Dr. Claiborne.

It was a case of **high myopia**, shown at the previous meeting, which had been operated upon with excellent results. The patient had vision $\frac{20}{70}$ before operation and $\frac{20}{30}$ after operation, with correcting lenses; one eye requiring a weak convex cylinder and the other a weak convex sphero-cylinder.

Discussion

Dr. W. B. Marple stated that he had operated upon a case of high myopia, 18 D., with sclerosed lenses. He made a preliminary iridectomy and subsequent discission in one eye, resulting in vision $\frac{20}{30}$ and reading J. 1, but notwithstanding that fact the patient continued to use his myopic eye for reading.

Dr. Denig stated that he had operated upon twelve cases during the past eight years; but he operated only upon those cases with no changes in fundus.

Dr. Barnes said that he had operated upon nine cases and always made an iridectomy. He does not consider the operation safe without it.

Dr. V. C. Pederson exhibited a new **gas ether inhaler.** A description of it is to be published in full in the *Annals of Surgery.*

Dr. J. H. Claiborne presented a specimen showing a piece of a **percussion cap in the globe.** The case was one in which

the tentative diagnosis was erroneous on account of the misleading history given by the patient.

About ten days later, when the true history of the injury to eye was obtained, a correct diagnosis was made and confirmed by a skiagraph, and the eye was enucleated. Upon section and examination the foreign body was found as indicated by the X-ray.

Dr. E. B. COBURN showed skiagraph of Dr. Claiborne's case, taken after enucleation.

Dr. KIPP said that it was generally supposed that copper or brass in an eye was more dangerous than other metals, but he did not think that this was necessarily so. He had a case still under observation in which a piece of a percussion cap had been imbedded in the retina for thirty-six years without apparent bad results.

Dr. E. GRUENING referred to a case in which a piece of copper had passed in and out of an eye with no worse result than if it had been any other metal.

Dr. DENIG described a case in which a piece of percussion cap passed through the sclera and lodged in the retina, remained there for four months, finally migrated and disappeared. It had remained in all five years without ill result.

Dr. DIXON stated that he had found that foreign bodies in eyes which were hardened after removal were sometimes displaced by the exudates contracting during freezing, but when they were fixed foreign bodies the measurements taken by the skiagraph chart remained true. He considered skiagraphing after enucleation as unnecessary and a waste of time.

Dr. W. B. MARPLE presented a specimen of sarcoma of the choroid. The case was one in which the tumor contained very little pigment, and which by transillumination with the Sachs illuminator showed no difference in the illumination, but, with a weaker light (Leber illuminator), it showed pupil in shadow, proving the necessity of using weak illumination in testing for tumors possessing small amount of pigment.

Dr. E. GRUENING gave some very interesting personal observations on ophthalmic hospitals and ophthalmic work

in Europe, made during his recent tour of Germany, Switzerland, and France.

Dr. FRANK J. PARKER read a paper: **The eye symptoms of trichinosis.**

Following is the author's abstract:

Packard in 1897, in reporting a case of trichinosis, spoke of the marked œdema of the eyelids, which subsided in four days. Oliver the same year reported the eye examination of a case which showed marked hyperphoria for near and far and a small striated hemorrhage overlying the inferior temporal vein in the left eye. Osler reported five cases in which there was œdema of the eyelids, and he regards this as an important symptom. Six cases were reported that were in the Presbyterian Hospital in the winter and spring of 1906, four of which sought professional aid on account of the eyes; in these six cases, all had collateral œdema and in four it was associated with conjunctival hyperæmia; four had tenderness of the globe and pain on rotation; one had subconjunctival ecchymosis; one case showed diplopia as the earliest symptom. One case had acute nephritis with neuroretinitis and hemorrhages. Various explanations have been given for the œdema, such as blocking of the lymphatics by the parasites, pressure upon the blood-vessels, and that the œdema is an attendant feature of the myositis and is most noticeable about the eyelids where serous effusions most readily occur. The trichinæ in the encysted condition remain alive and capable of development for many years, subsequent invasions producing more severe symptoms. Failure to find the trichinæ in the muscle sections should not mean a negative diagnosis, as a case may present the characteristic clinical picture before the trichinæ have developed in sufficient numbers to be easily discovered.

The important points in diagnosis are:

Fever resembling typhoid.

Leukocytosis ranging from ten to twenty thousand.

Eosinophilia from ten to seventy per cent.

Œdema of the eyelids, tenderness of the globe, and painful rotation.

Finding the trichinæ or the inflammatory areas between the muscle fibres.

DECEMBER 17, 1906. REPORTED BY DR. H. W. WOOTTON, SECRETARY.

Dr. J. H. CLAIBORNE was elected Chairman and Dr. H. W. WOOTTON re-elected Secretary for the ensuing year.

Dr. GEORGE H. BELL presented a case in which there had been a **double perforation of the globe by a piece of steel,** from Dr. Skeel's clinic. A radiograph of the case was shown and normal vision had been preserved. The patient was first seen June 29, 1906; he was a blacksmith, and while working on a piece of steel a fragment chipped off the face of his hammer and flew into his eye. There was a large wound near the limbus on the temporal side. The eye was very soft and filled with blood. V = o. An X-ray picture was taken by Dr. G. S. Dixon and showed that the piece had lodged well back in the orbit; size, 5.5*mm* x 6*mm*. An iridectomy was not attempted owing to the soft condition of the globe and the nature of the wound, as any manipulation would result in the loss of considerable vitreous. The patient was put to bed, atropin was instilled, and an uneventful recovery took place. At present there are some opacities in the periphery of the lens which have not increased any in the last three months. V = $\frac{20}{20}$ with correction. Dr. Bell was unable to locate the rent in the retina through which the steel passed. Instead of attempting to remove the steel from the orbit, Dr. Bell thought that it was too deeply imbedded and he preferred to let well enough alone. He thought the good result in the case was due to two facts: 1. Localization of the foreign body by means of the X-ray. 2. There had been no manipulation of the eye whatsoever; not even a speculum had been employed.

Dr. E. B. COBURN presented a Paquelin cautery which he had modified for eyework. It consisted of a brass tube, fitted at one end with a nipple for attaching the usual double bulbs for supplying a stream of air, and at the other end was connected by a bone plug to a platinum point such as is ordinarily supplied with pyrographic outfits. The bone plug referred to was employed on account of its being a non-conductor of heat. The cavity of the brass tube, or handle, is filled with wicking or asbestos, which is to be saturated

with benzine. A small mica shield protects the patient from the hot gas that escapes from the vent in the point. The instrument weighs less than an ounce and with the point is only about 5½ inches long; it is safe, portable, and inexpensive, and is not intended to supplant the galvano-cautery. Dr. Coburn stated he had found it useful for corneal ulcers, in conical cornea, and for the destruction of new growths.

Dr. J. H. CLAIBORNE presented a **chart illustrating the axis of astigmatism.**

The scheme was based on the positions of the axis of cylinders as they occur according to the trial frame, and upon the examination of 1176 cases of astigmatism.

In the scheme the arc of hyperopic astigmatism is an arc of 90 degrees.

Axes of preference: 90°, 75°, 45°, 105°, 135°.
Secondary axes 60°, 120°.

The arc of myopic astigmatism is an arc of 30 degrees.

Axes of preference: 180°, 15°, 165°.
Secondary axes 10°, 170° (highly exceptional).

There are two neutral axes, right and left, of 30° each; each is invaded by the convex and concave cylinders; called right and left, from their positions as one looks at the trial frame.

Right arc of neutrality:
Axes of preference: 30°, 20°.
Left arc of neutrality—sole axis 150°.
Convex cylinders occupy the axis 180° in 4%.
Concave cylinders occupy the axis 90° in 1.89%.

In conclusion, Dr. Claiborne deduced the following laws:

Law 1st: The angles formed by the axis of astigmatism are measured in arcs of a circle.

Law 2d: The law of multiples governs the magnitudes of these angles and arcs.

Law 3d: The arc of 15° is the common factor of arcs, and the angles vary in multiples of this number.

A further description of Dr. Claiborne's chart and his deductions will be found in the *Journal of the American Medical Association*, February 4, 1905.

Dr. H. H. TYSON presented a case of **sarcoma of the iris of the right eye.**

The growth first made its appearance about one year ago, since which time it has slowly but gradually increased in size until at present it is about 30% larger than when first noticed. The tumor was flesh-colored with a small pigment spot on the outer edge, with capillaries running over it, occupying the upper part of the iris, extending from the pupillary edges to the ciliary border, while on the posterior aspect the proliferation of pigment extended almost to the horizontal meridian. Vision normal. Clinically a diagnosis of primary sarcoma of the iris was made and concurred in by a number of ophthalmologists. Enucleation was advised, to which consent has been obtained. A histological report will be presented later.

Dr. H. H. TYSON reported a case of **double perforation of the globe** from a No. 7 gun-shot, with preservation of vision.

Dr. Tyson exhibited a radiographic chart of the case made by Dr. Geo. S. Dixon. The patient was a young man, aged twenty-two years, who, while hunting with friends, was accidentally shot in his face, four shot lodging therein, one in his forehead, over left eye, one in the left side of his nose, one in left cheek just below the malar process, and one passed through the left eye. It entered the outer side below the horizontal plane, passing inward, backward, and downward and through it, lodging in the orbit near the sclera. According to the chart, it was 3 x 3*mm* in size, and its centre was 21.25*mm* back of the centre of cornea, 7.75*mm* below horizontal plane, and 10.5*mm* on nasal side of vertical plane. Upon the first examination, Nov. 7th, the eye was inflamed, had hyphæmia, hemorrhages in vitreous, and the fundus was so hazy that the optic disk was barely visible. Vision $\frac{1}{200}$. Absolute rest in bed was advised, with kali iodid. internally. His vision gradually but steadily improved until at the examination on December 3d it was $\frac{20}{40}$. The media had cleared so that the details of the fundus were plainly visible, and the aperture made by the exit of the shot from the globe was distinctly observed, with flame-shaped hemorrhages radiating therefrom. The wound of entrance was observed well forward just behind the ciliary processes, with two string-like floating opacities attached thereto. The eyeball was perfectly white and free from all irritation, and he returned to

his work as a watchmaker. The iodide was continued in the hope of absorbing the remaining opacities and thereby still further improving the vision.

Dr. J. WOLFF presented a case of **Parinaud's conjunctivitis.**

The patient was a girl of twelve years of age. For past four weeks noticed slight ptosis of left upper lid and a moderate stringy muco-purulent secretion.

The conjunctiva of the tarsus and upper fornix shows a number of papillomatous excrescences varying in size from that of a trachoma granule to half a centimetre. In places they are confluent. The largest of them has an overhanging edge and is ulcerated on the surface. The preauricular gland on the left side is very much enlarged and tender. There are only two or three small excrescences on the conjunctiva of the lower lid.

Dr. MARTIN COHEN read the history of a case of **amaurotic family idiocy.**

When the patient was eight months old, a diagnosis was made of amaurotic family idiocy by Dr. I. Goldstein of this city. The patient was a female of Hebrew parentage. There had been no idiocy in the family, four older children being alive and healthy.

When the infant was five months old the mother noticed that it was not thriving as had the older children at the same age, that the head was not held erect, and that little notice was taken of the surroundings.

Physical examination when the patient was eight months of age showed the following: The child was stout but flabby. The skin and mucous membranes were pale. Though the behavior was dull and lethargic, occasionally there were sudden spasmodic movements of the trunk and extremities. The muscles were flaccid, and the head and back were poorly supported. From this time on, the general condition deteriorated, and the child grew progressively weaker and paler. At seventeen months a broncho-pneumonia developed. The child was apparently blind; the pupils were widely dilated and irresponsive to light. Ophthalmoscopic examination showed in the macular region of both fundi a pearly gray oval patch with the long diameter vertical, nearly twice the size of the disk. In the centre of this area was a sharply

defined oval spot of a cherry red color about one sixth the diameter of the patch itself. Both disks had the appearance of a well marked gray atrophy. Otherwise there were no pathological changes. One week later the patient died. The pathological report of the examination of the eyes by Dr. Dixon follows:

The eyes were measured immediately after removal. The vertical diameter was 21*mm*, transverse 21.5*mm*, antero-posterior 21*mm*. The clear cornea measured 12*mm* vertically by 12.5 laterally. Nothing unusual about the external appearance of the globes. The cornea, iris, ciliary body, lens, and choroid were normal. One eye had been hardened in formalin, the other in Orth's fluid. The retina of the eye hardened in formalin appeared shrunken and thin, the other appeared more nearly in its natural condition. In the latter its thickness 3*mm* to the nasal side of the disk was 236.6μ. The macula differed in thickness on the two sides of the fovea. Its greatest elevation was 425.6μ from the ends of the cones. The temporal side was 303.6μ. The fovea was flat and broad, measuring 239.4μ laterally. The margin arose abruptly instead of in the usual gradual manner. The depth of the floor of the fovea below the macular fold was 178.2μ.

True œdema was not noted, though there was present the usual spacing out of the external reticular layer a short distance on each side of the macula, which has been repeatedly reported in these cases. Muller's fibres did not appear in their usual form but as a conglomerate mass not easily distinguished. The multipolar ganglion cells were present in about their usual number outside the macula, but gave the impression of being swollen; were round in form. Giant ganglion cells were occasionally seen. The nuclei and the nucleoli were generally displaced to the side. In a few spaces the cells apparently remained. In the remaining cells reticular network was usually massed about the nucleus, being more or less scanty toward the periphery of the cell. Weigert's stain showed some dark granules in the cell protoplasm described by other observers. It also showed in the amacrine and bipolars. Dendritic processes of the multipolars were occasionally seen. There was no degeneration of the rods nor cones, and no changes in the other layers already mentioned. The optic

nerve was in the beginning of simple atrophy. Dr. Dixon stated that the consensus of opinion concerning the disease was that it was one of degeneration of the ganglion cells of the entire nervous system and that the changes in the retina and optic nerve were simply the ocular manifestations of a general disease. A complete autopsy on the case reported was unfortunately not obtained.

Discussion.

Dr. J. W. WEEKS thought that in Dr. Tyson's case tuberculin might be employed to establish a diagnosis, although the case did not have the appearance of tubercle, which should be grayer in color with lymph on the surface of the iris. This tumor was "cleaner" than either the tubercular or syphilitic tumor would be expected to be.

Dr. E. GRUENING thought that leuco-sarcoma was the correct diagnosis.

In this Dr. W. B. MARPLE agreed.

Dr. CLAIBORNE in the discussion of Dr. Cohen's case stated that he had seen the disease associated with general tuberculosis. Amaurotic family idiocy should no longer be regarded as peculiar to the Hebrew race. It did not always occur in members of the same family and the term "infantile" should be added.

Dr. SARIL thought that Dr. Wolff's case was certainly one of Parinaud's disease. Antiseptics and excision of masses were indicated.

Dr. CLAIBORNE also considered the case one of Parinaud's conjunctivitis, and stated that in his opinion the preauricular gland with the nodules in the conjunctiva was characteristic.

Dr. JOHN E. WEEKS presented a specimen of **non-pigmented tumor of the choroid** which involved the ciliary body and root of the iris in the lower outer portion. The cells of the growth were contained in irregular alveoli the walls of which were very thin and were composed of connective-tissue cells. About two thirds of the cell mass was made up of the ordinary sarcoma cells. The remaining third was made up of large, irregularly spherical cells possessing one or more oval nuclei with nucleoli. Although varying somewhat in size, they are

fairly uniform. The large cells are present in all parts of the growth.

The large cells apparently spring from the endothelium of the lymph-channels and blood-vessels, giving the growth the character of endothelioma.

Dr. C. W. CUTLER read a paper entitled **Relation between diseases of the eye and diseases of the nose.**

The following is an abstract of the paper:

The writer confined his attention to the association claimed by certain writers to exist between inflammation of the nose and especially of the sinuses, not necessarily purulent, and certain intraocular inflammations, such as uveitis, the cause of which is often obscure. The question is by no means a simple one, for mere coincidence of nose and eye trouble does not prove a causal relation.

In the writer's experience, such an association has not existed, although during the past years it has been his custom to have a thorough examination of the nose made in cases of uveitis, glaucoma, and detachment of the retina, in which the cause was obscure.

In most cases of detachment and of acute uveitis, frontal pain or nasal conditions were not prominent symptoms; but in two cases of the latter disease which yielded promptly to sodium salicylate, hot compresses, and atropin, the nasal conditions, or possibly the condition of the sinuses, which may have been a contributory cause, would have been favorably influenced by the treatment; and it is not fair to exclude this association until we know more of the relationship than we do at present. And it is important that specialists familiar with the technic of nasal and sinus conditions should be consulted in all doubtful cases.

The writer referred to contributions made by Winckler, Ziem, Kuhnt, and Posey, who have written about the anatomical relations of the orbit to the nose and sinuses.

Winckler, after describing the normal relations of veins and lymphatics, mentions certain anomalies, of which there are many, and says, in any case where disease of the eye certainly depends on nasal obstruction, there must be abnormal relations, otherwise the latter would be followed much more often by ocular disease.

Hyperæmia of the optic nerve is a frequent result, according to Kuhnt, of both acute and chronic processes, and is more apt to be congestive than inflammatory. This passive hyperæmia is an important predisposing influence for the different forms of intraocular inflammation. Many cases of the most diverse nature have been reported, but in proportion to the frequency of nasal and sinus disease, those with inflammation and with organic changes must still be regarded as exceptional, and due, as Winckler has said, to exceptional conditions.

Many cases may of course be classed as mere coincidences and others are classed as functional, having as a basis the nervous temperament, which makes one person suffer intensely from a fault or error which others endure with little or no discomfort.

Unpublished papers of Dr. Haskell of Boston were quoted at length. In one class, 65 cases were observed: "Headache was the most constant symptom, occurring at night or on wakening, and relieved by a change of position or any measure which lessened the congestion in the nose."

"Asthenopia and pain, independently of the use of the eyes, was frequent; a striking symptom was present in a number of cases—a feeling of confusion and helplessness in attempting any mental exertion, increased by use of the eyes, but not dependent on it."

A symptom pointing to the nose and on which Dr. Haskell lays stress, is a variable error of refraction which made it necessary to change glasses frequently, while after relief of the nasal condition, the refraction became stable, the astigmatism tended to become more symmetrical, and the glasses were worn with comfort.

Of the 65 observed, 8 per cent. were reported normal, 92 per cent. were faulty as to the nose; some form of pressure contact was found in 85 per cent. of all cases; 38 were operated upon, and among these there was no relief in 3 cases, partial relief in 19 cases, entire relief in 16 cases.

Of course it is important to determine, with as little loss of time as possible and the utmost consideration for the attending practitioner and for the patient, the relative importance in a given case of the nose and its adnexa on the one

hand, and of the eyes on the other hand, in the etiology of certain kinds of headache and ocular discomfort.

It is not possible to formulate rules which will have a general application, but the trained observer becomes skilled in determining which factor to attack first.

In the discussion which followed, Dr. WILLIAM C. POSEY of Philadelphia made the following statements:

If the skull is submitted to a series of cross-sections which expose the air spaces connected with the nose, and its neighboring structures, it is easy to comprehend why inflammatory conditions in these spaces should excite ocular symptoms. Contiguity of tissue alone is cause enough to occasion them, but when one views the enormous extent of the mucous membrane which is spread out upon the walls of the sinuses and of the nose itself, and considers the numerous and intimate connections which this mass of loose vascular tissue has with the orbit and its contents, it is difficult to understand how an inflammation of any degree of severity could arise in a sinus without provoking changes in the eye and its adnexa. And, as a matter of fact, although the eye is in a measure protected, by certain peculiarities of structure, from participating in these inflammatory conditions, ocular manifestations are not infrequently occasioned by them, and these occur in so striking and significant a manner that the diagnosis of the intranasal condition may often be suspicioned by the ocular signs alone.

Although cases which present ocular symptoms which are originated by nasal disease are not rare, in Dr. Posey's opinion they are frequently overlooked, the etiology of the ocular affection being attributed to other conditions. This is accounted for chiefly by the sinusitis escaping detection, for the diagnosis of this condition is not easy, and repeated examinations by an expert rhinologist are often necessary before the inflammation in the sinus is discovered. It happens too often that the possibility of an ocular inflammation having originated in a sinusitis is dismissed by the patient's declaration that he "has never had any trouble with his nose." There is ample proof that a mere congestion of the sinus, without the presence of exudate, is sufficient to excite marked ocular symptoms.

He said that he had seen other cases of moderate inflammation of the optic nerve complicating ethmoiditis and sphenoiditis which had been occasioned by bathing in cold salt water. In this class of cases the nerve, although protected from the sinus by its sheath and by the double layer of periosteum which covers the bone forming the barrier between the nerve and the sinus, becomes affected by contiguity of tissue, the inflammation varying in intensity from a simple œdema to an active retrobulbar inflammation. Moderate degrees of neuritis present but slight ophthalmoscopic signs, but may frequently be diagnosed by the distension of the lymph sheaths of the retinal vessels, and objectively by a diminution in the light sense, which may be conveniently tested by Bjerrum type. In this class of cases, there is often a feeling of fulness in the eye, with some pain on rotation and attempts at pushing the globe back into the orbit, the symptomatology, in fine, of cases of so-called "optic neuritis from rheumatism."

Indeed it is probable that if more cases of this type were subjected to a careful rhinological examination, a sinusitis would be found to be the underlying cause in many. The writer has not been able to convince himself of the changes in the field of vision which occur in cases of sinusitis without ophthalmoscopic signs, which Ziem and Kuhnt attributed to a nasal condition, and suspicions that the contraction and scotomata which were observed by these authors were due to neurasthenia or intercurrent causes. Naturally, scotoma and limitation of the field are to be expected where there is ophthalmoscopic evidence of neuritis.

Dr. Posey desired to emphasize the frequency with which œdema of the lids is encountered even in beginning cases of sinusitis. The puffiness is usually most marked in the upper lid and particularly on the nasal side, though the entire lid may be swollen. This œdema is to be distinguished from the inflammatory swelling and thickness of the lid which results from cellulitis, as it is entirely non-inflammatory in origin, as well as in appearance, and also from the ptosis which is at times present as a result of a palsy of the levator of the lid. The swelling is usually most marked in the morning and disappears during the day, but it is also apt to be brought on by bending the

head forward. Like all other ocular symptoms of sinusitis, the œdema may disappear for a time, with the discharge of secretion from the sinus, but reappears when the fluid reaccumulates and the congestion of the mucous membrane becomes greater.

That affections of the muscles of the eye are not infrequently the result of sinusitis is occasioned by the juxtaposition of some of them, like the internal and superior rectus, to the walls of the orbit, and by the very close association of the motor nerves supplying the muscles with the sphenoid cavity, as they pass along the outer wall of the sinus. Marked muscular insufficiencies not infrequently arise in this class of cases, hyperphoria and exophoria of varying degrees being the conditions generally originated by them, hyperphoria, of course, being induced by a swelling in the floor or the roof of the orbit, exophoria by some disturbance in the inner wall.

Dr. Posey referred to another class of cases which may be excited by a sinusitis and which are of great interest to the ophthalmologist, namely, those designated as "prelachrymal abscesses," the writer referring by this term to the swelling which forms at times above the internal palpebral ligament, and somewhat external to the lachrymal sac.

Though the differential diagnosis in these cases of prelachrymal abscesses is usually comparatively simple, at times the pus gravitates behind the sac in such a way that the exit to it is closed, and an ectasia of the sac itself occurs, with all the signs of true lachrymal abscess. Incision by means of the Bowman procedure does not, however, liberate any pus, the purulent matter escaping only after the probe is withdrawn and passed horizontally into the cells forming the inner orbital wall.

In conclusion, Dr. Posey said that while there may be a tendency upon the part of some to exaggerate the connection of ocular conditions with sinusitis, and while there is the temptation for all to discover causes which they are interested in finding, in agencies which may not be implicated in any way with the disease within the eye, careful rhinological examinations should be made in all suspected cases, and the possibility of the ocular affection being

occasioned by the nasal only dismissed when repeated examinations have failed to discover any disease within the cells.

In the discussion which followed Dr. C. G. COAKLEY stated that in acute sinus disease many patients complained of eye symptoms such as pain on rotation and on using the eyes; with the relief of the sinusitis the eye symptoms disappeared. Cases of chronic sinusitis for the most part gave no eye symptoms and when the patient had headache the question became one of operation. In cases of headache without discharge various conditions of the nose were found, but headache was not relieved by relieving these conditions; general causes for the headache should be sought before operation for the sinus trouble was attempted.

Dr. E. GRUENING stated that superficial ocular complaints due to various conditions of the nose were not infrequent, particularly lachrymation on exposure to cold.

Many of these cases were due to spurs of the septum, etc. The deeper affections of the eye were not caused by nose or sinus condition so far as he has been able to observe, except of course orbital cellulitis as is well known.

Dr. W. K. SIMPSON stated that between diseases of the nose and diseases of the eye there were two types of relation: the immediate and the remote; the former was due to abscess and sinus trouble, the destructive forms of syphilis, and marked nasal deformities. In all these, of course, the continuity of tissue made the relationship evident and easy to understand. The remote relation was a more reflex type and this relationship was more difficult to comprehend.

In the majority of acute cases of nasal and sinus disease, it was to be remembered that absolutely no eye symptoms were present.

Dr. COFFIN called attention to the fact that operation upon the nose was never followed by disease of the eye.

Dr. LINN EMERSON thought that eye symptoms were in very rare cases due to nasal affections, and the treatment of the sinuses and the nose cured these cases.

Dr. R. DENIG read a paper entitled **Some remarks on the operation for secondary cataract embedded in the vitreous.** This article appears in full in the January number of the *Ophthalmological Record.*

REPORT OF THE OCTOBER (1906) MEETING OF THE WILLS' HOSPITAL OPHTHALMIC SOCIETY, PHILADELPHIA.

A meeting of the Wills' Hospital Ophthalmic Society was held at the hospital on the twenty-second of October, 1906, Dr. S. LEWIS ZIEGLER presiding.

Dr. FRANK FISHER reported a case of **bullous keratitis** in which, after having tried various forms of treatment, he believed that it would be best to perform an iridectomy, although his experience in the past was against the procedure. Dr. CHARLES A. OLIVER favored the operation, basing his feelings in regard to the procedure upon the good results which had been obtained by him in somewhat similar conditions. Dr. ZIEGLER thought that attention to the tear passages with a subsequent iridectomy would be the best line of therapy. Dr. HAROLD G. GOLDBERG stated that in his hands dionin in five per cent. strength solution had been of value in some cases which had come under his observation: Dr. Oliver said that this had also been his experience.

Dr. FISHER exhibited an interesting case of **traumatism** from a fragment of tool or coal which had been inflicted two weeks previously. The foreign mass had torn through the lower outer corneal edge and ciliary region of the right eye. There was a localized opacity of the crystalline lens and adjacent capsule in the wounded area. Intraocular tension was normal. The case being a new one in the hospital, it was the consensus of opinion of those present that the X-ray should be immediately used and attempts made, if possible, to remove the foreign mass, do an iridectomy, and remove the lens; the case to be reported upon at the next stated meeting.

Dr. OLIVER exhibited a curious type of traumatism in

which the corneo-scleral limbus and the underlying iris had sustained a clean-cut incision from a large piece of steel that had not penetrated any farther into the eyeball. The two flaps of the wound were situated upon different planes and levels. The anterior chamber was closed. There was no reaction. The wound healed. Radiographs failed to show the presence of any foreign body in or around the eye, and the patient recovered with the restoration of the parts to their normal position with a scar which was only visible by strong concentration of light and high magnification. There was full vision and large uninterrupted fields. Treatment had been limited to the use of iced compresses, atropin, and rest in bed.

Dr. Oliver showed a case which he had seen two hours after an accident, and in which a drop of eserine had been instilled, carrying a small iris prolapse back into its normal position, and giving a round pupil without any appearance of traumatism other than a small slightly concentric vertical cut through the cornea. The following day, the patient reported with a localized iritis, a spongy deposit upon the anterior capsule of the lens, and a deep mass of lymph in the bottom of the anterior chamber. Vision was reduced from practically normal to light perception. The patient was immediately admitted to the hospital and placed in bed. Hot compresses were employed, and changeable iridoplegics and cycloplegics were used. All of the signs of inflammation subsided and the patient one week after he had been injured recovered with full acuity of vision—two small posterior synechiæ in the position of the previously bruised iris alone remaining. He brought the case before the Society to illustrate a principle which he and Dr. Fisher had established in their hospital services a number of years ago — to immediately excise all prolapses of the iris tissue, no matter how small or recent they might be. Dr. Fisher agreed with Dr. Oliver in reference to the advisability of such a procedure, and had made it an unalterable rule to do this in all cases of this kind since the time mentioned.

Dr. Ziegler spoke of a case with the history that a piece of steel had been driven into the eye several years previously, cataract developing. The patient had been in the hands of

a practitioner who had failed to make use of X-ray study. The moment that Dr. Ziegler saw the case, he ordered radiographs to be made, with the result that a foreign body within the eyeball was recognized. The mass was immediately removed, the cataract extracted, and vision with glasses was brought to almost normal; thus proving the direct advantage of X-ray study in every suspicious case.

Dr. McCLUNEY RADCLIFFE made mention of a case in which two sets of negative studies with the X-ray had been made in spite of the fact that he felt sure clinically that a foreign body was within the eyeball. A third series of plates gave an undoubted shadow with its localization. Immediate operation was resorted to, and a foreign body was successfully removed, leaving a useful and unirritated eye. The foreign body was two millimetres square in size. He also spoke of some rare types of traumatic cataract in which there was not any apparent external wound. In two cases that he had seen, the character of traumatism was extremely slight, one being the result of the shaking of a piece of light dress goods in which a closed eyelid was struck, and in which a resultant cataract was most probably caused by capsular breakage.

Dr. OLIVER gave a brief account of a case that he had seen two weeks previously, in which the findings of a carefully made X-ray study coincided exactly with those from a series of examinations of the visual field; it being his rule, whenever possible, to have the field of vision gone carefully over by a competent assistant. In this instance, a peripherally situated scotomatous area of positive type, sharply cut in outline, made him feel that either a small sector of the optic nerve had been injured or the adjacent retina had been seriously wounded. The foreign mass, a piece of steel some fourteen millimetres in length, most accurately located by Dr. William W. Sweet, showed that its posterior extremity was protruding through the posterior portion of the eyeball some two millimetres to the temporal side of the globe, and that it had cut the optic nerve in actual relationship with the lost portion of the field. An incision in the proper place being made, the foreign body was withdrawn upon the first essay of the magnet.

An informal discussion upon the use of iced compresses in cases of traumatism, both accidental and purposive, gave some interesting facts in regard to the first establishment of this form of practice in the hospital. Drs. Fisher, Oliver, and Ziegler related some details as to their difficulty in overcoming the many objections offered to the plan that they had encountered during the introduction of a method which is now so universally employed in the hospital, and which has met with so much success.

Dr. GOLDBERG gave a very carefully detailed account of a number of bacteriologic experiments which he had made with several different makes of **cosmoline.** As one of the results, he had found, among a great number of experiments, that certain kinds of cosmoline seemed germ free. His work, pursued with alkaline, acid, and neutral materials, gave findings which induced him to cover eyeballs that had been opened by traumatism with large masses of the germ-free variety of the drug. As a result, it is his belief that these types of material are of value in the treatment of open eye wounds, protecting them from the entrance of extraneous and harmful bacteria. He has now advanced sufficiently in the work to make clinical studies, some of which are in active progress. Thus far he has found that healing is more perfect and much more prompt with the use of the material than it is with other methods. In a number of his cases he had noticed that the patient had experienced the taste of the drug. Dr. ZIEGLER made mention of the fact that he had seen the drug employed empirically by others, and that he remembered that Dr. William F. Norris formerly used it to advantage in the hospital. Dr. OLIVER substantiated Dr. Ziegler's second statement, as he had often seen Dr. Norris successfully employ the then so-called refined makes of the material in many serious cases.

Dr. ZIEGLER gave a brief history of a case of **melanosarcoma** about as large as a small bean situated at the corneoscleral junction of the left eye of a middle-aged man in whom, six months previously, the growth appeared as a minute pigmented plaque. When the case was first seen, the patient had been advised immediate excision of the growth. At present the mass is lobulated, densely pigmented, and covers

one third of the cornea. The eyeball is involved and there is considerable injection. Just beneath the principal growth there is a small carnified non-pigmented mass which presses into the lower lid.

Dr. GOLDBERG showed a number of specimens of several types of **sarcomata** in various stages and in different positions, giving brief histories of the same.

REPORT OF THE MEETING OF THE OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

By Mr. C. DEVEREUX MARSHALL.

THURSDAY, OCTOBER 18, 1906. PRIESTLEY SMITH, F. R. C. S., PRESIDENT, IN THE CHAIR.

Mr. George Coats read a paper on **posterior scleritis, and infarction of the posterior ciliary arteries.** He referred to the first description of this condition by Fuchs in 1902, and to cases probably similar reported by Knapp, Wagenmann, and Salzer. Only two such cases had been submitted to pathological examination. In his own case the disease was not diagnosed during life, as the eye was already disorganized by iridocyclitis when first seen.

On dividing the globe, a peculiar round area 10*mm* in diameter was found above the papilla, in the form of a brown island, surrounded by a broad yellow moat or gutter. Within this area, the inner third of the sclera and the whole thickness of the choroid and retina were completely necrotic. There was no inflammatory thickening of the necrotic patch, but a moderate round-cell infiltration of the living tissues. The other changes in the eye were due to iridocyclitis and secondary glaucoma.

Mr. Coats pointed out that the amount of necrosis was out of all proportion to the inflammation, so that there must have been vascular obstruction. The necrosis was more extensive in the retina than in the choroid, and in the choroid than in the sclera, and this corresponded to the usual wedge shape of the infarction. The affected area would correspond to the distribution of one of the larger posterior ciliary vessels, and these vessels had but scanty anastomosis with each other.

The changes in the retina were closely similar to those found in the rabbit after ligature of the ciliary arteries, and in man after optico-ciliary neurotomy. The surrounding chronic inflammation was similar to that found in non-infective infractions elsewhere, and the chronic iridocyclitis was probably of the same nature, due to the diffusion of toxines of low virulence into the vitreous. There was some evidence of vascular obstruction in two of the other reported cases.

Mr. Holmes Spicer read a paper on **metastatic affections of the eye.** The first case was that of a young man who had a sudden attack of pain in one eye, with obliteration of the central part of the field of vision. He was in good general health except for a large crop of boils on the buttocks from rowing at Cambridge. On examination of the eye three days after the attack of pain, a brilliant green mass was seen springing from the centre of the disk; it was round, sharply defined, and had no appearance of structure, such as hooklets. Its appearance suggested a parasitic cyst. It continued to grow, and was making the patient very ill. It was lacerated with a needle under ophthalmoscopic guidance, but it contained only some cloudy opaque material like pus. The eye was enucleated.

The swelling was found to be an *abscess in the substance of the retina*, having in its centre a large mass of *staphylococci*. The patient made a rapid recovery in health.

The second case was also that of a young man who had had a large boil on the neck, and was suddenly seized with pain in one eye with loss of sight. He had well-marked phlebitis of the retinal arteries in one eye, and slightly in the other. After prolonged treatment *one eye got well*, and *the other became quiet with loss of sight.* Two years later it became acutely inflamed and was then enucleated. Although very seriously ill at the time, he recovered promptly after removal of the eye, showing it to be the only part affected.

The third case was also that of a young man who had *retinal phlebitis*, followed by *local keratitis profunda*, after a serious attack of diarrhœa and ptomaine poisoning.

The fourth case was one of diffuse exudation on *the surface of the choroid*, invading slowly nearly the whole of it and producing in places detachment of the retina. This also

occurred in a young man suffering from a large crop of boils, on the neck. Treatment by antistaphylococcal injections was commenced, but he refused to continue it.

Dr. EDRIDGE-GREEN read a paper on **observations on hue perception**. These observations were made with an instrument by means of which the exact size of a portion of the spectrum which appeared monochromatic was ascertained, when it was isolated from the adjacent portions. Hue perception was found to be most accurate in the blue and yellow regions, though in most it was more accurate in the yellow region. Then there was a gradual diminution towards the centre and ends of the spectrum. Green came next, then violet, and lastly red.

Three facts were in accordance with Edridge-Green's theory of color perception, and were predicted by it, namely that the color perception of different individuals varies with the development of a color perceiving centre in the brain, that those with a greater development of this centre see more colors (points of difference) than those with a less development, and that colors appear in a regular order at the successive points of difference in a straight series.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY IN THE THIRD AND FOURTH QUARTERS OF THE YEAR 1905.

By Dr. G. ABELSDORFF, in Berlin; Prof. ST. BERNHEIMER, in Innsbruck; Dr. O. BRECHT, Prof. R. GREEFF, Prof. C. HORSTMANN, and Dr. R. SCHWEIGGER, in Berlin; with the Assistance of Prof. A. ALLING, New Haven; Prof. E. BERGER, Paris; Prof. CIRINCIONE, Genoa; Dr. DALÉN, Stockholm; Prof. HIRSCHMANN, Charcow; Dr. J. JITTA, Amsterdam; Mr. C. DEVEREUX MARSHALL, London; Dr. H. MEYER, Brandenburg; Dr. P. VON MITTELSTÄDT, Metz; Dr. H. SCHULZ, Berlin; Prof. DA GAMA PINTO, Lisbon; and Others.

Translated by Dr. MATTHIAS LANCKTON FOSTER.

Sections I.–III. Reviewed by PROF. C. HORSTMANN, Berlin.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

635. HERING, E. **Outlines of the doctrine of light sense.** *Graefe-Saemisch's Handbuch der ges. Augenheilk.* Second edition. Leipsic, W. Engelmann, 1905.

636. SCHWARZ, O. *Encyclopædia of Ophthalmology.* 13th part. Leipsic, 1905.

637. OELLER, J. *Atlas of Rare Ophthalmoscopic Conditions, with Supplementary Tables to the Atlas of Ophthalmoscopy.* Part 4, Wiesbaden, 1905.

638. UHTHOFF, W. **Ophthalmology.** *Stereoscopic Medical Atlas.* Leipsic, 1905.

639. HEINE. *Guide to Examination of the Eyes in General Diseases.* Jena, 1905.

640. JANKAU, L. *Vade mecum for Ophthalmologists.* Third edition. Leipsic, 1905.

641. NAGEL, W. *Tables for the Investigation of Color Perception.* Third edition. Wiesbaden, 1905.

642. ROTHENAICHER. *Single, Removable Disks with Test Letters.* St. Gallin, 1905.

643. BLACK, N. M. **A new series of semaphore charts for testing**

the vision of railroad employees. *Am. Jour. of Ophthal.*, Feb., 1905.

644. COULOMB, R. *The Artificial Eye.* Paris, 1905.

645. LAGRANGE, F. and VALUDE, E. *Encyclopédie française d'ophtalmologie.* Vol. v. Paris, 1905.

646. LEWIN, L., and GUILLERY. H. *The Action of Drugs and Poisons on the Eye.* Berlin, 1905.

647. v. POEHL, A., v. TARCHANOFF, J., and WACHS, P. *Rationelle Organotherapie unter der Berucksichtigung der Urosemiologie.* Part i. St. Petersburg, 1905.

648. JACKSON, E., and DE SCHWEINITZ, G. E. *The Ophthalmic Year-Book for 1905.* Denver, 1905.

649. OHLEMANN. *Einiges über constitutionelle Erkrankungen und Augenleiden.* Leipsic, 1905.

650. BAUDRY, S. **Blessures de l'œil à la suite d'accidents du travail. Simulation et aggravation volontaires.** *Arch. d'ophtalm.*, xxv., pp. 465 and 531.

651. BACH. **Traumatic neuroses and accident estimates.** *Zeitsch. f. Augenheilk.*, xiv, 3–4, p. 351.

652. GROENOUW. **Disturbances of vision and health insurance.** *Klin. Monatsbl. f. Augenheilk.*, xliii., Beilageheft, p. 1.

653. KAZAUROW, J. **Determination of the percentage of the loss of working ability through injuries to the eyes.** *Westn. Ophth.*, 1905, No. 4.

654. WILMSEN. **The injuries to the eye in the Marbourg clinic.** *In. Diss.*, Marbourg, 1905.

655. WASSINTINSKY, A. G. **The vision satisfactory for military service according to the present law.** *Russk. Wratsch*, 1905, No. 31–32.

656. RUDIN, W. **Protective glasses for workers in hard materials.** *Westn. Ophthalm.*, 1905, No. 4.

657. GUILLERY. **Testing of vision.** *Arch. f. Augenheilk.*, liii., 2, p. 148.

658. SCHILLING. **Indirect illumination of schoolrooms with gas and electric light.** *Journ. f. Gasbeleuchtung u. Wasserversorgung.* 1905.

659. STONER, G. W. **Immigration. Medical Investigation of immigrants and the precautions taken by the government to exclude persons suffering from trachoma.** *Medical News*, 1905, June 20.

660. MEDEM, G. B. **Influence of heredity, of the family, and of the school on the vision of students as a symptom of threatening degeneration of our youth.** Poltowa, 1905.

661. DASTOT. **Should the truth be hidden from those who are threatened with blindness?** *Soc. Belge d'ophtalm.*, June 11, 1905.

662. NEESE, E. N. **Ophthalmology and its representatives in the University of Kiew since the foundation of its medical faculty.** Beilage to the *Westn. Ophthalm.*, 1905, No. 4.

663. PANSIER, P. **The ophthalmological practice of Daviel** (1735 to 1744). *Annal. d'Ocul.*, cxxxiv., p. 338.

664. HIRSCHBERG, J. **My third journey in America.** *Medicinische Klinik*, 1905, Nos. 42–46.

665. DISTLER. **The Stuttgart eye hospital for the poor. Ten years of medical activity.** *Wuerttemb. med. Corr.-Bl.*, 1905, No. 45.

666. WOOD, C. A. **The mammalian eye with special reference to the fundus appearances.** *Amer. Jour. of Ophthal.*, Oct., 1905.

HERING (635, **Outlines of the doctrine of light sense**) describes first the nature of colors and then the natural color system.

The thirteenth number of SCHWARZ's (636, **Encyclopædia of ophthalmology**) Encyclopædia contains in alphabetical order the articles "Nachstaroperationen" to "Neuritis optica."

The fourth number of OELLER's (637, **Atlas of rare ophthalmoscopic conditions, with supplementary tables to the atlas of ophthalmology**) atlas is a completion of his Atlas der Ophthalmoscopie which first appeared six years ago. It contains five plates, one of a case of retinitis proliferans, one of retinitis disciformis of the macula lutea, one of a cured detachment of the retina and sclerosis of the choroidal vessels, another of sclerosis of the choroidal vessels, and one of a direct rupture of the choroid.

The ophthalmological part of Neisser's stereoscopic medical atlas, edited by UHTHOFF (638, **Ophthalmology**), consists of the 53d and 54th numbers. In the 53d Wernicke furnished 12 plates on which are depicted a lid with an aperture, a peculiar pair of glasses, an acute lymphadenitis, a side of a face covered by a pigmented nævus, a spastic ectropion of the upper lid, a vernal catarrh, a conjunctival cyst, a glioma, a gummatous iritis, a lamellar cataract, a hyaloid artery in a six-months-old fœtus, and a papilloma of the iris. In the 54th number Wanner furnishes 12 plates on which are depicted a case of papilloma of the conjunctiva and cornea of the left eye, a globe with papilloma of the conjunctiva and cornea, lupus of the face, herpes zoster ophthalmicus, congenital coloboma of the upper lid, a double congenital coloboma of the lower lid, a ptosis adiposa of the upper lid, a cicatricial ectropion of the lids, ulcers of the lids from tertiary syphilis, Basedow's disease with a high degree of exophthalmus, solitary tubercle of the iris, and a case of oxycephalus.

HEINE (639, **Guide to examination of the eyes in patients with general diseases**) tells how an examination should be

made in order to determine whether any eye symptom exists which is of importance in the general diagnosis. The objective and subjective examinations are systematically described and the symptoms of such diagnostic help are arranged according to their frequency and importance. The work is based almost wholly on the author's experience, very slightly on literature.

JANKAU'S (640, **Vade mecum for ophthalmologists**) contains a calendar for 1906 and 1907, general information regarding food and its preparation, and drugs. The special part contains anatomical and physiological points in regard to the eye, fitting with glasses, estimation of accidents, together with clinical and therapeutic hints. Then follows a register. It is insufficient and incomplete.

The best proof of the usefulness of NAGEL'S (641, **Tables for the investigation of color perception**) is that they have been officially adopted by the railway administration.

BLACK (643, **Semaphore charts for testing the vision of railroad employees**) has designed charts which reproduce the signals used on the railroad in their original color on a green background. The size is so proportioned that the distance of 20 feet corresponds to that of half a mile in actual service.

ALLING (F.).

In the first part of his work COULOMB (644, **The artificial eye**) gives the history of artificial eyes. He describes those of ancient statues and of mummies as well as the protheses mentioned in the Talmud and by the ancient Romans. Later glass eyes came into use, and enamel about the beginning of the nineteenth century. The latter, vulcanite, and celluloid are still used. A chapter deals with their manufacture, another deals with the variations necessary in form, color, and mobility. The disturbances occasioned and the operations sometimes necessary to be performed in order to render the use of a prothesis possible are also described.

The fifth volume of LAGRANGE and VALUDE'S (645, **Encyclopédie française d'ophtalmologie**) encyclopædia contains Glaucoma and the sympathetic diseases of the eye by Gama-Pinto of Lisbon, The diseases of the lids by A. Terson of Paris, The tumors of the lids by Felix Lagrange of Bordeaux Diseases of the conjunctiva and diseases of the cornea by V.

Morax of Paris, Diseases of the sclera by Rohmer of Nancy, and The tumors of the conjunctiva, cornea, and sclera by F. Lagrange of Bordeaux.

LEWIN and GUILLERY (646, **The action of drugs and poisons on the eye**) describe in their first volume the paralysants and the excitants of the nervous system, together with the materials which produce chemical or physical changes in living albumin. The second volume contains antipyretics and antiseptics, tæniacides, drugs which affect the function of the heart, vessels, and kidneys, and those which act indirectly or mechanically on the eye. The work is an excellent compilation of the poisons and drugs which affect the eye.

The Ophthalmic Year-Book for 1905, by JACKSON and DE SCHWEINITZ (648, **The ophthalmic year-book for 1905**), is a compilation of the most important advances in ophthalmology during the past year.

The great work of BAUDRY (650, **Blessures de l'œil à la suite d'accidents du travail. Simulation et aggravation volontaires**)in regard to the injuries to the eyes of laborers and the voluntary simulation or aggravation of the same is unsuited to a brief review BERGER.

According to BACH (651, **Traumatic neuroses and accident estimates**), a traumatic neurosis appears in the eye as a muscular spasm either of the muscles of the globe or of the muscles of the lid, as a trophic disturbance making the brows and lashes gray, as vasomotor disturbances shown in slight cyanosis of the lids, hypo- and anæsthesia of the conjunctiva and cornea, rarely hyperæsthesia; inequality of the pupils and marked dilatation of the pupils are relatively frequent. Visual disturbances which greatly resemble those of hysteria are frequent, such as a concentric contraction of the field. The prognosis of a traumatic neurosis is usually unfavorable. A considerable improvement is met with, but no cures.

According to the experience of GROENOUW (652, **Disturbances of vision and health insurance**), inability to earn a living, in the sense of the health-insurance law, appears in the callings with slight optical demands when the vision of the better eye has been gradually reduced to less than $\frac{1}{10}$. In callings with greater optical demands reduction of the vision to $\frac{1}{8}$ or $\frac{1}{6}$ produces usually inability to follow that occupation

and not seldom inability to earn a living in the sense of the law. Not too important defects of vision and even hemianopsia usually cause only a transient invalidism. These boundary cases must be each adjudged individually, especially when they relate to persons who are otherwise sound and vigorous and not too old.

KAZAUROW (653, **Determination of the percentage of the loss of working ability through injuries to the eyes**) finds that Zosten's tables are not uniform and favor the employer at the expense of the employed. Zehender's formula is on the contrary unfairly in favor of the employed. He therefore advances this modification of Zehender's formula as more uniform and fair to both parties.

$$z, = 100 \left(1 - \frac{2(a+b)}{3}\right)$$

HIRSCHMANN.

WILMSEN (654, **The injuries to the eye in the Marbourg clinic**) reports 1271 persons treated for injuries of the eye at the Marbourg eye clinic: 270 were foreign bodies in the cornea, 38 lime-burns, 73 simple ulcers of the cornea and 103 cases of ulcus corneæ serpens, 85 cases of perforating wounds of the cornea, 35 cases of traumatic cataract, and 28 perforating wounds of the sclera. There were 5 cases of sympathetic ophthalmia.

According to GUILLERY (657, **Testing of vision**), there is no special dependence of the minimum visible on the light sense. The minimum visible furnishes a measure for the determination of the visual acuteness.

According to SCHILLING (658, **Indirect illumination of schoolrooms with gas and electric light**), gas illumination is not only equal to electric as regards clearness and even division of light, but superior in halls where moderate illumination of not great height is required.

According to STONER (659, **Immigration; medical investigation of immigrants and the precautions taken by the government to exclude persons suffering from trachoma**), 600,000 immigrants arrived in New York during 1904; 787 were refused admission because of trachoma. The law pronounces trachoma to be dangerous and all immigrants who present this disease in its florid stage are excluded. A fine of $100

is also imposed in cases where a later examination reveals the presence of trachoma and it is suspected that deception was practised at the landing place. Chronic, latent cases are not excluded. Acute cases may be retained in the hospital for a time for the purpose of observation. ALLING.

This statistical work brings MEDEM (660, **Influence of heredity, of the family, and of the school on the vision of students as a symptom of threatening degeneration of our youth**) to the conclusion that the rules which regard hygiene of the vision in the ordinary schools are only palliative, and that the defects which appear with the first instruction at home develop further in school. The hygiene must begin at home under the oversight of the mother. HIRSCHMANN.

PANSIER'S (663, **The ophthalmological practice of Daviel**) account of the ophthalmological activity of Daviel from 1735 to 1744 is a valuable contribution to the history of ophthalmology.

HIRSCHBERG (664, **My third journey in America**) furnishes some interesting notes on ophthalmological conditions in North America and describes the meeting of the Ophthalmological Section of the American Medical Association in Portland.

DISTLER (665, **The Stuttgart eye hospital for the poor**) describes the hospital, the operations performed, the injuries treated, and other work done therein during the past ten years.

WOOD (666, **The mammalian eye with special reference to the fundus appearances**) presented, at the meeting of the American Academy of Ophthalmology a description of the fundi of the mammalia, illustrated by colored stereopticon slides. His observations were largely taken from the work of Geo. Lindsay Johnson published a few years ago and now out of print. The illustrations are from paintings by A. W. Head many of which have not yet been published. A classification of mammals is first given and those are designated whose fundi were shown as typical of the various orders, families, and genera. Johnson has divided the mammalian fundi into three categories according to color. Red Type—Man and the Primates. Yellow Type—an example of which are the animals of nocturnal habits. Green-Yellow Type—some of the Carnivora and Ruminants. An interesting fact

is that many of the normal conditions observed in the lower animals resemble those found in man as pathological, such as membrana nictitans, retractor muscle, opaque nerve fibres, persistent retinal artery, optic coloboma, retinitis pigmentosa, etc. The refraction in wild mammalia is hypermetropic, but when they have been domesticated for a number of generations they generally become myopic and astigmatic. Man and the simiæ possess a distinct fovea centralis; others have sensitive visual areas, but, on the other hand, in many animals there is nothing to indicate that one locality of the retina is more sensitive than another. Concerning divergence of the optic axes, it is a fact that only man and the true monkeys have the power of convergence and parallel optic axes with eyes in a state of rest. In the lemurs or half monkeys there is no macula and the disk is white as if atrophic; Insect-eating animals have a uniform gray background. Seals have brightly colored fundi—yellow sprinkled with green dots in the common seal. The cat and hyena tribes have three colored zones—central light gold and brilliant, then emerald green, with the periphery dense purple-brown. In all carnivora the disk is round and cupped. In the ruminants the disk is horizontally oval and large with central depression. In these the intermediate rose-colored zone is believed, by Johnson, to be the area of acute vision. Among the rodents the squirrel has a large white elongated nerve head and the nerve fibres are visible radiating from the edge of the disk. The rabbit has a vermillion red fundus. The disk is ovoid and white and the retinal vessels branch right and left horizontally accompanied by two dense brushes of opaque nerve fibres. It would seem that the examination of animals should be employed as an aid to classification by practical zoölogists, and that light may be thrown on the anatomy and pathology of the human eye by these means.

ALLING.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND TREATMENT.

667. CLARK, SOMERTON. **Case of cryptophthalmos.** *Brit. Med. Journ.*, July 9, 1904.

668. BERGMEISTER, R. **Injuries of the eyes with ink.** *Zeitschr. f. Heilk.*, 1905, ix., p. 225.

669. Rothholz. **The treatment of the so-called scrofulous inflammations of the eye.** *Ther. Monatsch.*, 1905, No. 8.

670. Schein, Albert. **Excessive pigmentation of the human eye.** *Beitr. z. Augenheilk.*, 64, p. 75.

671. Gurfinkel. **Three cases of melanosis oculi.** *Westn. Ophthalm.*, 1904, No. 4.

672. Demaria, E. B. **Endogenous mixed infection of the eye with bacilli of tuberculosis and pseudodiphtheria. Tuberculous panophthalmitis.** *Kl. Monatsbl. f. Augenh.*, xliii., 90.

673. Pietrulla. **Diseases of the eye due to too great light.** *In.-Diss.*, Breslau, 1905.

674. Smith, Dorland. **Eye Infection. Second hundred cases with bacteriological examination.** *Arch. of Ophth.*, xxxiv., 5, p. 481.

675. Duclos, Lewis. **Bacteriological studies of post-operative infections.** *Annal. d'Ocul.*, cxxxiv., p. 409.

676. Chaillons, J. **Two cases of traumatic infection of the eye with an anærobic microbe (Bacillus perfringens).** *Annal. d'Ocul.*, cxxxiv., p. 115.

677. Mobilio, Giovanni. **Prognosi e trattamento delle ferite bulbare per arma da fuoco.** *Arch. di Ottalm.*, xii., 3–4.

678. De Lieto Vollaro, A. **Ricerche sul contenuto microbico della congiuntiva nel trattamento post operativo senza fasciatura occlusiva.** *Arch. di Ottalm.*, xii., 7–8.

679. Bietti, A. **Sul valore patogeno del bacillo del calazio di Deyl.** *Arch. di Ottalm.*, xii., 11–12.

680. Ovio, G. **Traumatismi oculari da caustici.** *La Clinica ocul.*, 1905, p. 2145.

681. Polatti, A. **La panoftalmite a bacillus subtilis.** *Annal. di Ottalm.*, 1905, p. 205.

682. Bietti, A. **Ricerche sperimentali sulla rigenerazione dei nervi ciliari dopo la neurectomia ottico-ciliare.** *Annal. di Ottalm.*, 1905, p. 205.

683. Magnani, G. **Contributo alla terapia della ipotomia oculare.** *Annal. di Ottalm.*, 1905, p. 43.

684. Ulrich, H. **Tetanus infection of the eye.** *Ber. d. ophthalm. Ges.*, 1905, p. 256.

685. Von Michel. **Tetanus after injury to the eye.** *Deutsche med. Wochenschr.*, 1905, No. 47, p. 1909.

686. Rosenthal, O. **Infection of the conjunctiva and its signification in general infection. Glasses as a protection against and a carrier of infection.** *In.-Diss.*, Berlin, 1905.

687. Koster, Gzn, W. **Treatment of ocular tuberculosis with tuberculin.** *Verhandl. d. 10 holländ. Naturforscher und Aerzte Congress*, 1905.

688. Elschnig. **Ocular diseases from autointoxication.** *Klin. Monatsbl. f. Augenheilk.*, xliii., ii., p. 417.

689. Groyer. **Ocular diseases and gastro-intestinal autointoxications.** *Münchener med. Wochensch.*, 1905, No. 39.

690. UHTHOFF, W. **Injuries to the eyes following injections of paraffin into the bridge of the nose.** *Berliner klin. Wochenschr.*, 1905, No. 47.

691. ROHMER. **Accidents to the eyes following injections of paraffin about the nose.** *Annal. d'Ocul.*, cxxxiv., p. 163.

692. BOLOGNESI, G. **Delle iniezoni di paraffine fuse nei tessuti oculari.** *Annal. di Ottalm.*, 1905, p. 79.

693. LEBER, TH. **Notes on the mensuration of the filtration of the eye.** *Annal. d'Ocul.*, cxxxiv., p. 217.

694. OVIO, G. **Case of bilateral anophthalmos.** *La Clinica oculistica*, Oct., 1905.

695. RAVE. **Intraocular injections of iodoform.** *In.-Diss.*, Würzburg, 1905.

696. AXENFELD. *Serum therapy in infectious diseases of the eye.* Freiburg, 1905.

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697A. OVIO, G. **Osservazioni cliniche sulla causticazione ignea a scopo terapeutico in oculistica.** *La Clinica oculistica*, Nov. and Dec., 1905.

698. TARTUFERI, F. **Su di uno terza nuova impregnazione metallica dei tessuti e specialmente della cornea.** *Annal. di Ottalm.*, 1905, p. 74.

699. SYM, W. G. **Note on atropine irritation.** *Ophthalmoscope*, Apl., 1905.

700. GIERTZ, R. G. **The action of radium on the eye.** *Upsala Lakaraforen forhand.*, x., p. 400.

701. HOLTH, S. **Roentgen ray diagnosis and extraction of foreign bodies from the eye.** *Norsk. Magaz. f. Lage rid.*, 1905, page 418.

702. HOLTH, S. **Localization of foreign bodies in the eye by means of the ultra-violet rays.** *Rev. gén. d'Ophtalm.*, xxiv., p. 433.

703. DOR, L. **How to protect the eye against the ultra-violet rays.** *Rev. gen. d'Ophtalm.*, xxiv., p. 433.

704. SCHMEICHLER. **Detection of simulated monolateral amblyopia.** *Wiener klin. Wochensch.*, 1905, No. 46.

705. PERGENS, L. **The influence of size and number on the measurement of the visual acuteness.** *Rev. gen. d'Ophtalm.*, xxiv., p. 385.

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707. VAN DUYSE, D., and DE NOBELE, J. **The protection of the eye in radiotherapeutic treatment of parts neighboring to that organ.** *Annal. de la Soc. de Méd. de Gand*, 1905, p. 183.

708. KRAISSELSKY. **The influence of resection of the cervical sympathetic on the cicatrization of wounds of the eye.** *Thesis*, Lausanne, 1905.

709. GOLESCEANO. **Steam treatment of the eye.** *Rec. d'Ophtalm.*, xxvii., pp. 385 and 449.

710. LAGRANGE. **Amelioration of the prothesis by a graft from the eye of a rabbit.** *Arch. d'Ophtalm.*, xxv., p. 421.

711. TORNABENE, C. **Influenza della iridectomia, dei miotici, dei midriatici e degli anestetici sul passergio nella camera anteriore di alcune sostanze iniettate sotte la cute.** *Arch. di Ottalm.*, xii., 1–2.

712. BORTHEN, L. **Open wound treatment.** *Norsk. Magaz. for Lager*, 1905, p. 673.

713. THOMPSON, J. J. **Recent modifications in the technique of some operations on the globe and the adnexa.** *Ophth. Rec.*, March, 1905.

714. HANSELL, H. F. **Diaphoresis in ophthalmology.** *Therap. Gazette*, May, 1905.

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716. BULLARD, J. W. **The use of pure nitric acid in the treatment of diseases of the eye.** *Amer. Jour. of Ophth.*, March, 1905.

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718. DE SCHWEINITZ, G. E. **Metallic foreign bodies within the eye and their removal, being a clinical account of twenty-six operations of this character.** *Amer. Jour. of Ophth.*, April, 1905.

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720. VOGT, ALFRED. **Experiments in regard to the chemical peculiarities of the basic aniline colors as the cause of their harmful action on the conjunctiva.** *Zeitschr. f. Augenheilk.*, xv., 1, p. 58.

721. WOOD, CASEY A. **Poisoning by wood or methyl alcohol and its preparations as a cause of death and blindness; a supplementary report.** *New York Medical Journal*, Jan. 7, 1905.

722. TUCKER, E. F. **A case of ocular defects associated with congenital deformity of the cranium (oxycephaly).** *Lancet*, July 9, 1904.

723. WAMSLEY, J. W. **The sulcus question for artificial eye.** *Ophth. Record*, Nov., 1905.

724. GIFFORD, H. **On the clinical importance of the diplobacillus of Morax and Axenfeld.** *Ophth. Record*, Nov., 1905.

725. WHEELOCK, K. K. **Eye defects associated with the development of puberty.** *Medical Record*, Oct. 21, 1905.

726. BRUNS, H. D. **A case of inherited and acquired syphilis in the same subject.** *Ophth. Record*, Sept., 1905.

727. BUCHANAN, MARY. **Two cases of spasmus nutans.** *Annals of Ophth.*, July, 1905.

The child reported by Clark (667, **Case of cryptophthalmos**) was a Mohammedan aged 6 months, whose eyeballs were completely covered with skin. There were no eyelashes. The eyeballs were prominent and the child could move them. An incision was made over the left globe and it was found

that the conjunctival sac was complete only towards the lachrymal gland and in the internal and lower segment. The cornea was covered with a loosely attached membrane, but no pupil could be seen when this was dissected away. The child had also webbed fingers. There was no sign of syphilis.

MARSHALL.

BERGMEISTER (668, **Injuries of the eyes from ink**) has observed that sometimes a severe purulent inflammation may be excited by pricking the cornea with ordinary ink. The cause of the inflammation was shown by experiments to be the necrosis of the corneal tissue in the neighborhood of the injury produced by the constituents of the ink. Aniline dyes which contain no free acid cause no true inflammation or necrosis of the cornea, but are injurious when applied in powder to the conjunctiva.

ROTHHOLZ (669, **The treatment of the so-called scrofulous inflammations of the eye**) calls attention to the fact that a large number of cases of apparent scrofulous inflammation may be caused by nasal suppuration. The nasal condition should receive careful attention. He recommends atropine when photophobia is present, and airol ointment (1:14) for the conjunctival affection. Yellow precipitate ointment should be used as soon as the corneal irritation has subsided.

SCHEIN (670, **Excessive pigmentation of the human eye**) reports four cases of excessive pigmentation of the eye. In three the sclera, iris, conjunctiva, and choroid were affected, particularly the sclera, in the fourth the conjunctiva.

In all three cases reported by GURFINKEL (671, **Melanosis oculi**) there was an abnormal pigmentation of the left eye alone. In one case the skin of the lids was covered with spots of pigment as well as the sclera, subconjunctival tissue, and conjunctiva, the iris was of the color of a black cherry, the inner parts of the eye were normal. In the second and third cases the skin was normal, and the pigmentation affected the conjunctiva, sclera, and retinal pigment layer. In one of these cases four patches of pigment were present on the papilla.

HIRSCHMANN.

According to DEMARIA (672, **Tuberculous panophthalmitis**) an endogenous tubercular infection of the eye may run the course of a subacute panophthalmitis. In the case he reports

there was a mixed infection of tubercle and pseudodiphtheria bacilli. The latter were concerned in the purulent character of the inflammation. Many bacteria of the diphtheria group are very pathogenic in the eye, even the filtered cultures show this pathogenic character. It is particularly noticeable that after injection of the filtrate into the vitreous there was an extensive detachment of the epithelium of the anterior capsule.

In addition to the description of a case in which there was a transient change in the macula due to blinding by the sun, PIETRULLA (673, **Diseases of the eye due to too great light**) describes the diseases caused in the eye by over-blinding. Experiments show the same as clinical experience that under certain conditions light may be injurious to the eye. The injuriousness of a source of light is dependent on its short waved rays, the greater the proportion of such rays the greater is its power for injury to our eyes.

DORLAND SMITH (674, **Eye infection**) found, in 65 cases of infectious conjunctivitis, staphylococcus 14 times, pneumococcus 12 times, gonococcus 6 times, Morax-Axenfeld's diplobacillus 6 times, meningococcus once, diphtheria bacilli once, and streptococci 3 times. In 10 cases of corneal disease, streptococci were found 4 times, staphylococci twice. In 10 cases of dacryocystitis, pneumo- and streptococci were found in 7. ABELSDORFF.

DUCLOS (675, **Bacteriological studies of post-operative infections**) has observed 9 cases of panophthalmitis which followed cataract extraction. In 7 pneumococci, in 2 streptococci were present. The two forms of infection differ clinically. In a pneumococcus infection a plug of pus is formed in the wound and extends into the eye. In a streptococcus infection cloudiness of the cornea and iris quickly appears. In the majority of the cases disease of the lachrymal passages was present, in the others there were diseases of the conjunctiva or of the margins of the lids. In no case was sugar or albumin found in the urine. Duclos believes that the influence of diabetes or of albuminuria over the production of panophthalmitis after cataract operation has been greatly exaggerated. BERGER.

CHAILLONS (676, **Two cases of traumatic infection of the eye**

with an anærobic microbe) describes 2 cases of traumatic infection of the globe by an anærobic microbe which caused panophthalmitis. He describes minutely the peculiarities of this microbe, which he has named the "bacillus perfringens."

BERGER.

According to MOBILIO (677, **Prognosi e trattamento delle ferite bulbare per arma da fuoco**) the seriousness of shot wounds of the eye depends first of all on secondary infection. Enucleation is unconditionally indicated only when serious inflammatory symptoms are present and show a progressive character. If the shot is in the anterior chamber the irritation may be purely mechanical and relieved by the removal of the foreign body. The presence of a shot in the posterior part of the eye causes no severe irritation in the absence of infection. CIRINCIONE.

LIETO VOLLARO (678, **Ricerche sul contenuto microbico della congiuntiva nel trattamento post operativo senza fasciatura occlusiva**) comes to the following conclusions:—1. Even with Czermak-Fuchs after-treatment of operations an increase of the microbes in the conjunctiva is present a certain number of hours after the operation. 2. This increase is less with this treatment than when an occluding bandage is applied. The microbes found after the operation are the same as those found before the operation. CIRINCIONE.

BIETTI (679, **Sul valore patogeno del bacillo del calazio di Deyl**) presents the results of his investigations regarding the frequency with which the so-called xerobacillus, identical with Deyl's bacillus, is met with in chalazia. He instituted a series of experiments in which he injected bouillon cultures of the xerobacillus beneath the palpebral conjunctiva of rabbits and concluded from them that the so-called experimental chalazion may be a product of various micro-organisms independently of their virulence, and that the xerosis bacillus is not specifically fitted for the production of a chalazion. Probably the various micro-organisms exercise an irritant action similar to that of the xerosis bacillus, like foreign bodies. CIRINCIONE.

OVIO (680, **Traumatismi oculari da caustici**) applied to the surface of the eye of rabbits the various chemical caustics

which are used in ophthalmic practice. From these experiments he learned that burns with acids are in general less severe than those with alkalies. A drop of nitric or sulphuric acid is sufficient to destroy the eye. Acetic acid is less powerful, diluted with water it can still give rise to indelible spots. Caustic potash is even in dilution stronger than the above named acids. Its greater strength depends on the fact that the size of a drop of a saturated, watery solution of potash is twice as large as that of a drop of sulphuric acid. Tincture of iodine, chloroform, ether, alcohol, carbolic acid, and concentrated solutions of corrosive sublimate are harmful to the eyes. CIRINCIONE.

POLATTI (681, **La panoftalmite a bacillus subtilis**) reports a series of experiments in which he injected pure cultures of the bacillus subtilis or emulsions of earth into the vitreous of rabbits, or introduced foreign bodies artificially infected with the bacillus. Control experiments were maintained. The chief conclusion arrived at was that the pathogenic action of the bacillus subtilis which originates in the earth cannot be doubted when introduced into the vitreous.

CIRINCIONE.

BIETTI (682, **Ricerche sperimentali sulla rigenerazione dei nervi ciliari dopo la neurectomia ottico-ciliare**) experimented on dogs which he killed from nine months to over two years after he had performed on them neurectomia opticociliaris. The results of these investigations show that no cord was formed between the two stumps of the optic nerve to reunite them. There was not a complete degeneration of the nerve cells of the ciliary ganglion. The experiments indicate that regeneration of the ciliary nerves may take place to a greater or less extent. CIRINCIONE.

MAGNANI (683, **Contributo alla terapia della ipotomia oculare**) reports several cases of hypotony which he treated by galvanic stimulation of the superior cervical ganglion of the sympathetic. Encouraging results were obtained in four cases.

CIRINCIONE.

A great part of the cases of tetanus complicated by injuries to the eye should not have the eye injury looked upon as the etiological factor. According to ULRICH (684, **Tetanus infection of the eye**) the tetanus bacillus behaves in the eye of

a rabbit just the same as in the rabbit's body, it cannot grow well and the animal is not seized with tetanus. On the contrary the intraocular injection of any bacteria brings about tetanus infection of the eye following local inflammatory symptoms. Eight days after the infection of the anterior chamber the tetanus germs were still in the aqueous and after five weeks they could be demonstrated by cultures in the iris.

V. MICHEL (685, **Tetanus after injury to the eye**) reports a case of injury with a stick followed by exophthalmos with chemosis and suggillations, and also amaurosis with the ophthalmoscopic picture of occlusion of the central artery. Then followed high fever, vomiting, lockjaw, and rigidity of the neck. Exenteration of the orbit with resection of a piece of the roof of the orbit showed that the meninges were intact, but revealed a piece of wood between the superior orbital fissure and the optic foramen. Death followed in spite of injections of tetanus serum into the dural sac. On autopsy there was found a hemorrhage in Tenon's space, purulent infiltration of the orbital cellular tissue which had extended to the arachnoid and pia and along the septa of the optic nerve.

According to the experiments of ROSENTHAL (686, **Glasses as a protection against, and a carrier of, infection**) glasses exercise a certain limited degree of protection against infection. It seems to be more important that otherwise infected glasses may be a source of danger to the wearers and that the protective glasses worn in inflammatory diseases of the eye should be carefully cleansed and disinfected.

KOSTER (687, **Treatment of ocular tuberculosis with tuberculin**) uses tuberculin in tuberculosis of the eye when the usual treatment and the insufflation of air into the anterior chamber have failed, that is when the choroid and ciliary body are involved, and has obtained good results. JITTA.

According to ELSCHNIG (688, **ocular diseases from autointoxication**)a large number of inflammatory diseases of the cornea, sclera, (including severe recurrent scleritis) and uvea are referable to autointoxication of gastrointestinal origin. The only general treatment which promises a result is regulation of the diet and of the intestines with repeated intestinal disinfection. Two forms of iridocyclitis depend usually on

intestinal autointoxication, the first is particularly common with women, running a chronic course with numerous precipitates, synechiæ and vitreous opacities, which is characterised by its lingering character and innumerable remissions and exacerbations. The second form is the recurrent iritis.

GROYER (689, **Ocular diseases and gastro-intestinal autointoxications**) confirms Elschnig's views. In most of his cases indican could be found in the urine.

UHTHOFF (690, **Ocular injuries due to injections of paraffine**) reports two cases in which serious injuries to the eyes followed injections of paraffine into the nose for cosmetic purposes. In one case, that of a woman 45 years old, the injection was followed by the typical picture of embolism of the central artery of the retina. The eye was permanently blinded. A minute particle of paraffine in fluid condition must have entered the circulation and been carried into the central artery of the retina. In the second case, that of a man 57 years of age, three injections of paraffine were made. Then the lids became greatly thickened so that the patient could no longer open his eyes.

ROHMER (691, **Ocular injuries due to injections of paraffine**) describes a case of monolateral amaurosis which resulted from paraffine injection. Several injections of vaseline paraffine were made to cosmetically correct a nasal deformity produced by necrosis in a woman 42 years old who had had primary syphilis 15 years before. After the last injection there was severe pain caused by a thrombosis of the orbital vein with consecutive thrombosis of the retinal veins, which resulted in the ophthalmoscopical picture of hemorrhagic retinitis. The injection had been made with too great intensity and had advanced to the inner canthus. In order to avoid similar accidents Rohmer recommends to use paraffine with a low melting point, to inject only small quantities several times without great pressure, and to prevent by the pressure of the finger of an assistant the advance of the paraffine into the neighboring tissues which are not to be injected. BERGER.

BOLOGNESI (692, **Injections of paraffine**) reports a number of experiments with melted paraffine, the melting point of which was somewhat higher than the body temperatures of

the animals used, in the tissue of the cornea, in the anterior chamber and in the orbit after enucleation, and gives the pathological results obtained. The substance acted as an aseptic foreign body and was encapsuled by newly formed connective tissue from which dividing walls extend which cut the paraffine into smaller portions. No chemical action was observed, either locally or at a distance. There seemed to be no tendency to the formation of emboli, such as were met with in paraffine injections of other organs. In brief the pathological condition corresponds simply to the mechanical action of the paraffine upon the elements of that tissue of the eye with which it was experimentally brought in contact. CIRINCIONE.

LEBER (693, **Notes on the mensuration of the filtration of the eye**) undertook with Pizecker to determine whether their view was correct that with a constant intraocular tension the same quantity of fluid which enters an eye must also escape. To their great astonishment these results showed that this theory was not absolutely correct. Too great elasticity has hitherto been ascribed to the capsule of the eye. Probably the increase of volume of the eye without a permanent increase of the intraocular tension is to be explained by a change in the curvature of the wall of the globe which more nearly approaches the form of a sphere. The results of the experiments do not alter the objections which Leber has raised to the theory of glaucoma advanced by Uribe y Troncoso.

BERGER.

OVIO (694, **Case of bilateral anophthalmos**) describes in an infant born at full term which died a few days after birth properly formed though somewhat sunken lids, with a conjunctiva which formed a funnel with a short canal leading into the orbit. No trace of eyeball could be seen. Well developed muscles with numerous glands were present, all in the midst of partly loose, partly fibrous connective tissue. It appeared to be a case of true bilateral anophthalmos.

CIRINCIONE.

RAVE (695, **Intraocular injections of iodoform**) had 8 unfavorable results out of 17 cases treated with intraocular disinfection with iodoform. In the other cases there was at least preservation of the globe in a quiet condition. Iodoform

was introduced three times after post-operative infection. One case was an ordinary one of intraocular suppuration which began suddenly and ran a rapid, unfavorable course, in one case it was the result of corneal infection and the remaining 12 were caused by injuries. The iodoform was introduced after a hypopyon was present. Seven of the cases in which the eyes had to be removed were cases of perforating wounds.

In his work *Serumtherapie bei infectiösen Augenentzündungen*, AXENFELD (696, **Serum therapy in infectious diseases of the eye**) speaks first of this treatment as applied to infection of the eye with diphtheria bacilli. According to his experience the serum should be used immediately in every case of pseudomembranous conjunctivitis in which Loeffler's bacilli are present, because the relatively mild cases may be complicated with severe, even fatal, diphtheria of the throat, the origin of which may be traced from the eye through the naso-lachrymal duct to the throat. The mild cases also are just as contagious as the severe, and may cause very severe diphtheria in other persons. The serum is best administered by subcutaneous injection. The second part of the work deals with the serum treatment of pneumococcus infection of the eye, ulcus serpens and wound infection. According to his observations a beneficial influence of Römer's serum therapy on ulcus serpens cannot be recognised. For prophylaxis in corneal injuries with unclean surroundings the combination of the use of Römer's serum with that of dead cultures is recommended. After the disease is established the serum therapy alone is justified only in the first stage, afterward the simultaneous method. When undertaken successive increasing doses are indicated; if the ulcer advances continued serum treatment may in many cases check it. But for such ulcers doses of over 30*ccm* are not permissible. Very large doses, even when they check the disease are, aside from their great cost, no improvement over the galvanocaustic because finally the scar will be very extensive and a cure is uncertain. It is not advisable to confine the treatment to serum in moderate and large ulcers, with the exception perhaps of very superficial relatively benign cases, in which expectant treatment is permissible or if very severe

ones in which the older treatment is inapplicable or has failed. Another use of the serum is for pneumococcus infection after deep injuries or operations. Here also prophylaxis occupies the first place for it is difficult to influence the established disease.

Serum therapy plays no great part against streptococcus infection in ophthalmology because the cases are rare. Good results from the use of Marmorek's serums in dacryocystitis were reported. Serum therapy against staphylococcus infection is of still less importance because of the infrequency of such cases in the eye. The ordinary staphylococcus lid abscess heals readily after incision.

Ovio (697, **Actual cautery**) writes: The mechanism of the beneficial effect produced by the actual cautery in certain affections of the eye is well known. But there are cases in which such cauterization is of benefit while the mechanism of its action is not apparent; as in extensive ulcers, abscesses and purulent wounds of the cornea. For in these cases the entire portion affected cannot be involved in the destructive action of the cautery and yet through it the favorable influence is impressed on the disease. The author concludes from the experiments he has undertaken, that the results produced by the actual cautery are twofold. First there is destruction followed by a stimulated process of regeneration in the tissue, and in consequence of this stimulation the tissue is permeated after the cauterization with numerous active elements. Everyone understands how advantageous the attainment of such processes may be when they are produced in diseased tissues the elements of which are from more than one cause in bad nutritive condition. CIRINCIONE.

Ovio (697A, **Actual cautery**) gives a historical resume of the use of the actual cautery about the eye and then discusses its practical application. The cauterization of the appendages of the eye which was used so much formerly has now been almost completely given up with the exception of the ignipuncture for telangiectatic tumors. The use of the actual cautery is necessary and advisable to the base of malignant ulcers of the limbus, after removal of a pterygium to its remains on the cornea in order to bring it to cicatrization before the conjunctiva, to residues of corneal pannus in the

form of a peritomy when there are some large vessels which spread out on the cornea, and in phlyctenular keratitis with a tendency to the formation of abscesses. In progressive ulcers keratotomy and cauterization are of equal value when the ulcer is circumscribed. If the ulcer is diffuse cauterization is of less value, so that a few days later keratotomy will be performed. In very severe cases in which the ulcer occupies two-thirds or more of the cornea while the rest is hazy and a hypopyon is present cauterization and keratotomy should be performed simultaneously. CIRINCIONE.

TARTUFERI (698, **Su di uno terza nuova impregnazione metallica dei tessuti e specialmente della cornea**) presents a modification of the procedure for metal impregnation. Before he submits the tissue to the action of the sodium thiosulphate and the silver chloride he fixes it for a short time in a 1 % sublimate solution. CIRINCIONE.

SYM (699, **Note on Atropine irritation**) observed a case in which watery solutions of atropine caused a dermatitis, while a solution in pure olive oil sterilized by heat could be used without the production of irritation of the skin. He used ichthyol for the dermatitis. DEVEREUX MARSHALL.

GIERTZ (700, **The action of radium on the eye**) has made some experiments in order to determine whence comes the fluorescence which produces the diffuse greenish light that appears when a preparation of radium is approached to an eye adapted to the dark. He used bromide of radium enclosed in a lead tube with its end hermetically closed. He thinks that the light seen when a preparation of radium is held before the eye is the fluorescence which is formed in the portion of the eye in front of the iris, probably the eyelids, and that no impression of light is obtained when this part is not hit by the radium rays. He has not seen any bad after effects of the radium rays. HELLGREN.

HOLTH (701, **Roentgen ray diagnosis and extraction of foreign bodies from the eye**) uses two plates, one bitemporal, the other occipito-frontal, and two little indicators of lead fastened in the bulbar conjunctiva close to the limbus corneæ in the vertical meridian. HELLGREN.

HOLTH (702, **Localization of foreign bodies in the eye by means of the ultra violet rays**) recommends the following

method. After cocainization a plano-convex piece of lead is sutured to the conjunctiva at the upper and lower margin of the cornea. The head of the patient is secured in a head-rest, such as used by Helmholtz in the investigation of the movements of the eye. A bitemporal and a frontal plate is used. If the foreign body lies *23mm* behind the centre of the cornea of an emmetropic eye it is to be assumed to lie in the eye itself. If the distance is from 24 to *27mm* it is to be assumed that the foreign body has perforated the posterior wall of the globe. In cases of ametropia *1mm* is to be added for each 3 D of myopia, or subtracted for hypermetropia. The refraction of the injured eye cannot usually be determined because of the cloudiness of the media and in those cases the refraction of the uninjured eye should be determined and assumed as correct for the injured one. In cases of marked anisometropia an exact localization cannot be obtained by this method. HOLTH reports some very excellent results. BERGER.

DOR (703, **How to protect the eye against the ultra-violet rays**) refers to the investigations of Widmark, Birch-Hirschfeld and others who have shown that the ultra-violet rays are injurious to the cornea, lens, and retina. By means of photography he has found what kinds of glass absorb these rays. He finds that yellow protective glasses are the best. Some smoky gray glasses absorb a portion of the ultra-violet rays but also a great part of the light rays. Flint glass, which is recommended in commerce for the absorption of the ultra-violet rays, allows them to pass. He suggests that the glasses which absorb the chemically acting rays should be denominated "achemic." BERGER.

The method used by SCHMEICHLER (704, **Detection of simulated monolateral amblyopia**) was to place a strong convex lens (20 D) before the supposed good eye which would exclude its vision for distance and while the patient thought that the good eye was being tested the vision of the bad one was determined.

PERGENS (705, **The influence of size and number on the measurement of the visual acuteness**) comes to the following conclusions. 1. Two squares are more easily recognized than a larger number. 2. The difficulty of counting them

increases with the size of the squares. 3. The length of the letters has a varying influence on the visual acuteness. The latter is best when the length is from 4 to 6 times the horizontal diameter. BERGER.

PARDO RUGGERO (706, **Use of roentgen rays**) has used the roentgen rays in cases of trachoma, follicular and vernal catarrh, episcleritis, and scleritis. In trachoma it brought about a disappearance of the follicles, of the pannus and of all signs of inflammation without the formation of a cicatrix. The results were uncertain in follicular and vernal conjunctivitis, good in scleritis and episcleritis. CIRINCIONE.

In order to protect the eyes during radiotherapy V. DUYSE and DE NOBELE (707, **The protection of the eye in radiotherapeutic treatment of parts neighboring in that organ**) cover that organ with a lead covered glass plate.

GOLESCEANO (709, **Steam treatment of the eye**) recommends the application of hot steam (45 to 50C) in diseases of the lids, conjunctiva, and anterior segment of the globe, for which purpose he has designed a special instrument. He has obtained good results in blepharitis ciliaris ulcerosa bilateralis, blepharitis scrophulosa, keratitis phlyctenularis parenchymatosa, herpes febrilis corneæ, infiltrates of the cornea, scleritis, iritis. In diseases of the eye dependent on nasal disease, endonasal applications of hot steam containing the vapor of menthol 2 parts, guiacol 5 parts and spirits of camphor 80 parts were employed. BERGER.

LAGRANGE (710, **Amelioration of the prothesis of a graft from the eye of a rabbit**) reports 8 cases in which he made transplantations from the eyes of rabbits in order to obtain a better prothesis.

According to TORNABENE (711, **Influenza della iridectomia, dei miotici, dei midriatici e degli anestetici sul passergio nella camera anteriore di alcune sostanze iniettate sotte la cute**) when an iridectomy is performed with a scleral incision not only is the escape of the endocular fluids increased, but the production of the aqueous is also hastened and increased, while no such influence is exhibited when the incision is in the cornea. The transition of fluorescin and iodide of potassium into the fluids of the eye takes place more quickly and in greater quantity when cocaine, eserine, or pilocarpine

has previously been instilled. Atropine has a diametrically opposite effect. CIRINCIONE.

BORTHEN (712, **Open wound treatment**) has used the open treatment after operations of the eye recommended by Hjort since 1895, and goes so far as to treat his patients operated on for cataract as walking cases and without a bandage. He emphasizes the importance of the movements of the lids for the cleansing of the eye and that the eye is less hyperæmic when it is not tied up. The open treatment is more convenient for both the patient and the surgeon. In prolapse of the vitreous healing is obtained more readily through the gentle pressure of the lids than under a dressing, if the patient will only keep his eye closed voluntarily for the first few hours after the operation and wink only occasionally. Incarceration of the iris does not occur any more frequently in connection with the open treatment than under a dressing. When the lachrymal sac is diseased the open treatment is particularly indicated. HELLGREN.

THOMPSON (713, **Recent modifications in the technique of some operations on the globe and the adnexa**) leaves the conjunctiva open in advancements until the knots have been tied, then with the same suture inserted in the right place he closes the wound. In extirpation of the lachrymal sac he introduces a probe and divides the overlying tissues upon this. Then he carries a suture about the sac by means of a hook at the level of the commencement of the nasal duct. After excision of the sac the latter is drawn forward and removed. ALLING.

HANSELL (714, **Diaphoresis in ophthalmology**) warmly recommends diaphoresis except in cases of chronic syphilitic disease of the uveal tract, traumatism and cases of unknown etiology. Steam baths are better than pilocarpine. The patients are placed in a bath of about 160°F. for ten to twelve minutes and then tucked up in bed where they perspire freely. Medicaments are superfluous. ALLING.

GIFFORD (715, **On some unusual effects of iodide of potassium**) has seen many times a phlyctenular eruption on the conjunctiva. In one case yellow pustules appeared at the margin of the cornea which contained xerosis bacilli and staphylococcus albus. In another case a little abscess formed in the

deep layers of an old corneal scar. He enumerates various complications which are mentioned in literature, such as fatal gastritis, œdema of the larynx, parotitis, dacryocystitis, otitis media, psychic affections and purpura. He has seen two cases of the last named disease.

ALLING.

BULLARD (716, **The use of pure nitric acid in the treatment of diseases of the eye**) considers nitric acid to be the best chemical cautery for the eye, but it is difficult to see how it surpasses the thermocautery. ALLING.

POST (717, **An experience with staining the skin by argyrol**) found the eyelid shining black a day after an injection of argyrol into the cavity left by the removal of a chalazion. He ascribes the cure, at least in part, to the use of injections of iodide of potassium. ALLING.

DE SCHWEINITZ (718, **Metallic foreign bodies within the eye, and their removal**) demonstrates the usefulness of the roentgen rays for the localization of foreign bodies. In 15 cases the foreign bodies were accurately placed by radiography. One foreign body was in the anterior chamber, one in the lens, six in the ciliary region, nine at the equator and nine near the posterior pole. The final result as regards vision was 1.6/6, 2.6/15, 1.6/9, 6.6/6, one counting of fingers, 5 perception of light, 2 phthisis bulbi, and 8 enucleation of evisceration. In 13 of the 26 operations the point of the small magnet was introduced into the vitreous. In 6 an incision was made. In 7 the foreign body was drawn into the anterior chamber. He is of the opinion that after careful localization foreign bodies can be removed through an incision in the sclera without having to introduce the magnet into the vitreous. The results are as good as if not better than when they are drawn around the lens into the anterior chamber.

ALLING.

GIFFORD (719, **The breech-pin in Ophthalmology and Surgery**) recommends the use of a skiagram in all cases in which the eye has been injured as the result of the bursting of a gun in order that screws, bolts or other parts of the breech may not be embedded in the eye and overlooked. He reports an interesting case. ALLING.

According to VOGT (720, **Experiments in regard to the**

chemical peculiarities of the basic aniline colors as the cause of their harmful action on the conjunctiva) the basic aniline colors are salts of mineral acids with color bases. An experimental comparison of them and of their basic aniline derivatives shows that their injurious action on the conjunctiva is to be referred to remains of phenyl in conjunction with the amido group. The injuriousness is increased by augmented basicity in the combination and still more by the introduction of alkyls in the amido group, proportionately to the number of the alkyls. The mineral acids of the basic coloring matter does not influence the injuriousness and only serves the purpose of making the coloring matter soluble in water and thereby able to act. It is also independent of the increase of the granules of benzoin in the molecules. On account of the danger from aniline colors it is best to avoid the use of them in the eye.

Poisoning by wood alcohol may produce blindness and even death as is shown by WOOD (721, **Poisoning by wood, or methyl alcohol and its preparations as a cause of death and blindness; a supplementary report**). He reports 6 cases, 2 died after drinking this preparation, 2 became blind, and 2 recovered. The symptoms of wood alcohol poisoning are abdominal pain, weakness of the extremities, and total blindness of both eyes which transiently improves and then goes on to complete loss of the power of vision.

The patient described by TUCKER [722, **A case of ocular defects associated with congenital deformity of the cranium (oxycephaly**] was a Mahratta aged 20 with no family history of cranial deformity. He was intelligent and normal in all other respects. The measurements are given in detail and these give a cephalic index of 57.3. The palate was high and arched. Exophthalmos was increased by pressure on the lids, there was external strabismus especially of the left eye, the retinal vessels were somewhat tortuous and the movements of the eyeball were impaired in certain directions. Photographs of the patient are given. MARSHALL.

WAMSLEY (723, **The sulcus question for artificial eye**) prepares the socket for the reception of the artificial reform eye by stretching with glass balls graduated in size and replaced daily. ALLING.

GIFFORD (724, **On the clinical importance of the diplobacillus of Morax and Axenfeld**) believes that, of all the germs which affect the eye, the bacillus of Morax and Axenfeld is next in importance to the pneumococcus and pus cocci. The ordinary lesion is a mild catarrhal conjunctivitis while at times there is an acute and a chronic conjunctivitis which closely resemble trachoma with roughness and swelling of the retrotarsal folds. Occasionally serious ulcerations of the cornea are due to the diplococcus but show less disposition to spread than the more virulent forms. The germ cannot be distinguished by the microscope from Pettit's bacillus a rarer form. The latter germ grows on agar and gelatine which it liquefies. He recommends zinc chlorid and suggests treatment of the nose as well. ALLING.

WHEELOCK (725, **Eye defects associated with the development of puberty**) believes that the eyes are liable to disturbances in circulation during the period of development of the sexual function. There is a permanent limitation of the field of vision, leucocytosis and temporary loss of vision. ALLING.

The patient of BRUNS (726, **A case of inherited and acquired syphilis in the same subject**) had all the characteristics of inherited syphilis and acute iritis in connection with a papillar syphilide from the acquired disease. ALLING.

Spasmus nutans is a neurosis occurring in children between the fourth and twelfth month, characterized by movements of the head associated with nystagmus BUCHANAN (727, **Two cases of spasmus nutans**) from the study of two cases believes that the effort to establish binocular vision is an element in the causation. The prognosis is always good. ALLING.

III.—REMEDIES AND INSTRUMENTS.

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as a local resorbent and analgesic in diseases of the eye. *Deutsche med. Wochenschr.*, 1905, No. 47.

732. FÖRSTER. **Dionin and atropine.** *Wochenschr. f. Ther. und Hyg. des Auges.*, ix., No. 20.

733. CONNOR, L. **Dionin in ocular therapeutics.** *Ophthalmology*, 1905, p. 629.

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736. HUMMELSHEIM, ED. **The action of alypin, a new ocular anæsthetic.** *Arch. f. Augenh.*, liii., 1, p. 18.

737. IMPENS, E. **Local anæsthesia with alypin.** *Deutsche med. Wochenschr.*, 1905, No. 29.

738. NEUSTÄTTER, O. **Alypin, a new substitute for cocaine.** *Münchener med. Wochenschr.*, 1905, No. 42.

739. KÖLLNER, H. **The signification of alypin for ophthalmology.** *Berl. klin. Wochenschr.*, 1905, No. 43.

740. SEIFERT. **Alypin.** *Deutsche med. Woch.*, 1905, No. 34.

741. STÖTZER. **Alypin, a new anæsthetic.** *Ibid.*, 1905, No. 36.

742. JACQUES. **Alypin.** *The Ophthalmoscope.* 1905, p. 551.

743. LANDOLT. **Alypin.** *Wochenschr. f. Ther. u. Hyg. des Auges*, 1905, No. 16.

744. WEIL, R. **Alypin, a new local anæsthetic.** *Allgem. Med. Centralzeitung*, 1905, No. 36.

745. BRAUN, H. **Some new local anæsthetics (stovain, alypin, novocain).** *Deutsche med. Woch.*, 1905, No. 42.

746. DANIELSEN, W. **Policlinic experiences with the new local anæsthetic novocain.** *Münch. med. Wochensch.*, 1905, No. 46.

747. HEINECKE, H., and LÄWEN, A. **Experimental and clinical studies regarding the value of novocain as a local anæsthetic.** *Deutsche Zeitschr. f. Chirurg.*, lxxx., p. 180.

748. BIBERFELD, J. **Pharmacology of novocain.** *Med. Klinik.*, 1905, No. 48.

749. SCRINI. **The use of alkaloids in oily solutions.** Paris, 1906.

750. STEINKÜHLER, M. **Protargol.** *Wochenschr. f. Ther. u. Hyg. des Auges*, ix., No. 6.

751. FORTUNATI, A. **Thigenol in ocular therapeutics.** *Annal. di Ottalm.*, xxxiv., p. 630.

752. RE, F. **Tachiol in ocular therapeutics.** *Archivo di Ottalm.*, xii, 1–2.

753. GODTS. **Treatment of ocular superficial infections.** *Annal. de Soc. med. chir. d'Anvers*, 1905, No. 1–3.

754. GWATHMEY, J. T. **The vapor method of anæsthesia.** *Med. Record*, Oct. 14, 1905.

755. JURNITSCHEK, F. **Der Innenpol-Magnet.** *Zeitsch. f. Augenh.*, xiv., p. 390.

756. MAGNANI. **Modifications of some ophthalmic instruments.** *Annal. di Ottalm.*, xxxiv., p. 647.

757. PERLMANN, A. **The refractiometer.** *Berl. klin. Wochenschr.*, 1905, No. 44.

758. DE SUREL, J. **Clinical pupillometry. The corescope.** *Rev. gén. d'ophtal.*, xxiv., p. 289.

759. THOMPSON, H. WRIGHT. **A convenient instrument for rapid retinoscopy.** *Ophthalmic Review*, July, 1905.

760. FEILCHENFELD, H. **Fitting and adjustment of glasses.** *Deutsche med. Wochenschr.*, 1905, No. 28.

RISLEY (728, **Subconjunctival salt injections**) favors subconjunctival injections of normal salt solution, and has never found them to be painful or to be followed by reaction. The products of inflammation overload the conjunctival and subconjunctival lymph spaces leading from the cornea and uveal tract, and it seems likely that the injections serve to dilate the spaces and hasten the lymph current thus aiding absorption and bringing fresh lymph to the affected area. The theory that osmosis plays any part in the process is probably untenable. ALLING.

DEBECK (729, **Accident with adrenalin**) for cosmetic purposes instilled a 1:1000 solution of adrenalin into a congested eye which was recovering from a syphilitic iritis. About an hour later the vision became blurred, and the next morning he found the anterior chamber filled with blood. The eye perfectly recovered. ALLING.

KÖNIGSHÖFER (730, **Advances in the treatment of eye diseases**) speaks first of local anæsthesia. Cocoaine still holds first place, but eusemin, a mixture of cocaine and adrenalin, eucainum lacticum, yohinbinum lacticum and stovain, the last two unsuited for eyework, have been recommended. Alypin is better. For general narcosis Valude recommends chlorethyl. Trigemin is an internal analgesic. Of the silver salts protargol is the most prominent as an astringent and antiseptic with collargol, actol, ichthargan, and albargin following. Of the mercurial preparations sublamin and hermophenyl are used for general antisepsis. Oxycyanate of mercury is much used for subconjunctival injections. Hydrogen peroxide has a firm footing in the treatment of diseases of the lids and of the conjunctiva. The introduction of suprarenal preparations in the form of atrabilin, adrenalin, hemisine, suprarenin, and paranephrin has been very im-

portant. Dionin has an anæmia-producing action. In external diseases of the eye aristoloel, liquor aluminis acetici, cuprum citricum, and jequiritol have been used. In addition hot-air treatment, radiotherapy, tuberculin treatment, and serum therapy are mentioned.

According to AXENFELD (731, **Experimental and clinical study of dionin as a local resorbent and analgesic in diseases of the eye**) the local application of dionin to the eye causes a burning sensation and an œdematous swelling of the conjunctiva and lids. It has a marked resorptive action in chronic iritis, and in serous iritis it causes the deposits on the posterior surface of the cornea to disappear very quickly. It also has an analgesic effect.

FÖRSTER (732, **Dionin and atropine**) uses dionin combined with atropine in corneal ulcers and reports a satisfactory result.

CONNOR (733, **Dionin in ocular therapeutics**) has obtained good results from dionin in cases of fresh infiltration of the cornea, senile marginal ulcers, iritis and iridochoroiditis. Analgesia was produced in almost all cases. An inundation of lymph is caused in consequence of which resorption rapidly takes place. As yet he has met with no serious complications.

According to SNYDER (734, **Physiological action of dionin**) the action of dionin is purely local, through reduction of the intraocular tension and formation of œdema in the cornea.

FEJER (735, **Eumydrin as a mydriatic**) used eumydrin experimentally in keratitis, which was favorably influenced by a 2% solution and in iritis in a 4% solution. He observed no bad effects.

According to HUMMELSHEIM (736, **The action of alypin, a new ocular anæsthetic**) alypin is one of the means by which it is hoped to obtain the anæsthetic action of cocaine without its unpleasant and harmful after-effects. It is an amido-alcohol-benzoate and is dropped into the eye in a 2% solution. In its anæsthetic action there is no difference between it and cocaine. It causes a slight, very transient dilatation of the vessels. After the instillation it causes a slight burning. The size of the pupil and the accommodation are not noticeably affected by a 2% solution. No injury to the corneal epithelium was noticed after repeated applications of alypin.

IMPENS (737, **Local anæsthesia with alypin**) finds alypin pharmacologically a local anæsthetic of neutral reaction, freely soluble in water, which is as effective as cocaine, less poisonous, and produces no mydriasis, no disturbance of accommodation, and no contraction of the vessels.

According to NEUSTÄTTER (738, **Alypin a new substitute for cocaine**) the advantages possessed by alypin over cocaine are that it does not disturb the pupil, is less poisonous, and stands boiling well.

According to KÖLLNER (739, **The signification of alypin for ophthalmology**) a drop of a 5% solution of alypin produces an anæsthesia of the cornea sufficient for the performance of an operation and apparently greater than that produced by the same strength of cocaine. In this dose there appeared no demonstrable influence on the inner muscle of the eye, but with a larger dose combined with preparations of suprarenal capsule such an influence is usually noticeable. The peculiar constrictive action of cocaine on the vessels is absent with alypin, and this absence is noticeable in operations and in inflammations. In small doses alypin is superior to cocaine in the rapid appearance of sufficient anæsthesia and in the absence of noticeable mydriasis and disturbance of accommodation. In larger doses alypin may cause transient products of excretion in the cornea.

In alypin we have as SEIFERT (740, **Alypin**) believes a valuable substitute for cocaine which equals it in anæsthetic power and is to be preferred as less toxic and cheaper. STÖTZER (741, **Alypin, a new anæsthetic**) also considers alypin at least equally as efficient an anæsthetic as cocaine. It has no psychical influence, produces no irritation, attacks of dizziness, or congestion. According to WEIL (744, **Alypin, a new local anæsthetic**) alypin is a valuable substitute for cocaine and to be recommended in all cases in which a mydriasis is not needed.

Stovain has according to BRAUN (745, **Some new local anæsthetics**) good anæsthetic properties with a relative toxicity scarcely less than that of cocaine, but its acid solutions irritate and injure the tissue. Alypin has a very strong anæsthetic action which is greatly increased by the addition of very small quantities of suprarenin, but is markedly

irritant and injurious to the tissues. Novocain is the monochlorhydrate of p-aminobenzoyl-diethylaminoæthenol. In connection with suprarenin it is a powerful local anæsthetic. He has observed no toxic after-effects. DANIELSEN (746, **Policlinic experiences with the new local anæsthetic novocain**) also finds novocain to be a non-irritant, rapid and powerful local anæsthetic and has observed no toxic after-effects, sign of irritation, or necrotic action. Novocain interferes in no way with the action of suprarenin and may well be sterilized. According to HEINECKE and LÄWEN (747, **Experimental and clinical studies regarding the value of novocain as a local anæsthetic**) a further advantage of novocain is that it is useful for all forms of local anæsthesia. It is as good as cocaine for infiltration and conduction anæsthesia. BIBERFELD (748, **Pharmacology of novocain**) also speaks favorably of novocain.

SCRINI (749, **The use of alkaloids in oily solutions**) favors the use of alkaloids in solutions of olive oil.

According to STEINKÜHLER (750, **Protargol**) solutions of protargol should he made with cold water and not warmed. They should always be freshly made because they easily spoil and become corrosive.

According to FORTUNATI (751, **Thigenol in ocular therapeutics**) a 5% solution of thigenol in water produces no irritation when dropped into the conjunctival sac of a healthy eye. Strong solutions and the drug itself in a pure condition induce a slight transient discomfort. He has found it very useful in eczema of the lids and in blepharitis, and of less value in acute and chronic conjunctivitis. He has also obtained good results in diseases of the lachrymal passages.

CIRINCIONE.

RE (752, **Tachiol in ocular therapeutics**) considers that tachiol has the same indications as nitrate of silver. It is better borne and less irritating than the latter. It is strongly antiseptic and in consequence of its weak caustic property has more penetrating power. It is preferable to sublimate. It is not to be recommended for the sterilization of instruments because it spoils them. CIRINCIONE.

The use of strong antiseptics in infections of the eye is sensible only so long as the microbes are on the surface. But

as soon as they penetrate, as soon as lesions are present, the application of the ordinary antiseptics is not only useless but is to be avoided because of their injurious action on the tissue. This applies particularly to silver nitrate, but also to its substitutes, the organic silver salts and silver albuminates. GODTS (753, **Treatment of superficial ocular infections**) has used collargol for the past two years in superficial infections of the eye, less on account of its strongly antiseptic property than because it appears to strengthen the power of resistance of the organism according to the investigations of Robin. Its application is painless and unirritating, and because of its harmlessness it can be entrusted to the patient. It has given good results in acute and subacute conjunctivitis with or without purulent secretion, in ophthalmia neonatorum, in trachoma with much secretion, in corneal ulcers, and in dacryocystitis in combination with the usual probing, but not so good in the not markedly infectious diseases. It is used in instillations of a 1 or a 2% solution.

GWATHMEY (754, **The vapor method of anæsthesia**) describes an apparatus for the induction of vapor anæsthesia.

The **Innenpol-magnet** of JURNITSCHEK (755) consists of an oval ring which contains a very great number of coils of a copper wire 1*mm* in diameter, enclosed in a mass which furnishes sufficient isolation for the electric current. To increase the magnetic induction the spool is enclosed in an iron mantle, while the opening differs from Haab's instrument in that it contains no iron nucleus. The middle of the ring, the opening, is placed about the head of the patient. To the lower side of the solenoid is attached a horizontal plate of hard rubber for the hand of the operator. Several pins, or styles, of soft iron of various sizes and weights accompany the instrument. After the patient has been seated and his head introduced into the ring the operator takes a style like a pencil in his hand, carries it with his hand resting on the hard rubber into the magnetic field of the opening of the spool when it becomes a strong magnet. As the head of the patient, who has the iron foreign body in the eye, is already in the spool and opposite the rod the foreign body must be magnetized and the two magnets must draw toward each other.

The modified instruments mentioned by MAGNANI (756, **Modifications of some ophthalmic instruments**) are Mellinger's blepharostat, a synechiotome, and a sickle-shaped knife for the performance of an iridotomy without emptying the anterior chamber. He also describes an electric apparatus for campimetry and a forceps for everting the upper lid and laying bare the fornix. CIRINCIONE.

The Refractiometer of PERLMANN (757) consists of a frame for glasses adjusted to the form of the face which contains before each eye two movable discs with lenses as in the refraction ophthalmoscope. The lenses have a diameter of 6*mm*. Astigmatism is determined after ascertaining the axis with a slit.

The corescope (pupillometer) of DE SUREL (758, **Clinical pupillometry. The corescope**) consists of a frame in which two black threads are so arranged that they form a very acute angle with each other. The frame is passed before the eye until the two threads touch the margins of the pupil. The diameter is then to be read on the frame. BERGER.

THOMPSON'S (759, **A convenient instrument for rapid retinoscopy**) instrument consists of a light round frame in the midst of which is fastened a long handle. In the frame are twenty lenses such as are commonly used in retinoscopy. One end of the handle is held under the right arm while the frame is rotated before the eye of the patient with the left hand. Otherwise it resembles in use an optometer. It weighs nine ounces. DEVEREUX MARSHALL.

FEILCHENFELD (760, **Fitting and adjustment of glasses**) emphasizes the fact that glasses, particularly cylinders, must have the correct position. They should be well centred and at a slight distance from the eye.

Sections IV.–VII. Reviewed by DR. ABELSDORFF, Berlin.

IV.—ANATOMY.

761. HOTTA, G. **The eye of the anthropoid apes. Contribution to comparative anatomy with special reference to the musculatures of the iris.** *Arch. f. Ophthalm.*, lxii., 2, p. 250.

762. HORNICKEL, PAUL. **The histological formation of the lachrymal glands of the domestic animals.** *Inaug.-Dissert.*, Giessen, 1905.

763. BERND, A. H. **The development of the pecten from the**

layers of the optic vesicle in the eye of the chicken. *Inaug. Diss.*, Bonn, 1905.

764. SCHUEPBACH. **Contribution to the anatomy and physiology of the ganglion cells in the central nervous system of pigeons.** *Zeitschr. f. Biologie*, xlvii., p. 439.

765. MOST. **The lymph vessels and glands of the conjunctiva and lids.** *Arch. f. Anatom. u. Physiol.*, 1905. Anatomical part, p. 96.

766. MATYS. **The development of the lachrymal passages.** *Zeitschr. f. Augenheilk.*, xiv., p. 222.

767. ABELSDORFF, G. **Pigmentation of the optic nerve in animals.** *Arch. f. Augenheilk.*, liii., 2, p. 185.

768. ABELSDORFF, G. **The eye of the new-born kitten, with special reference to the neuro-epithelial layer of the retina.** *Ibid.*, p. 257.

769. WOLFRUM. **Dry celloidin.** *Klin. Monatsbl. f. Augenh.*, xliii., 2, p. 61.

770. COATS, GEORGE. **The structure of the membrane of Bruch and its relation to the formation of colloid excrescences.** *Royal London Ophthalmic Hospital Reports*, vol. xvi., part 2.

771. LODATO GAETANO. **Il tessuto elastico dell' occhio umano durante la vita fetale.** *Archivio di ottalmologia*, xii., 5–6.

772. MUENCH, KARL. **The innervation of the stroma cells of the iris.** *Zeitschr. f. Augenheilk.*, xiv., 2, p. 130.

HOTTA (761, **The eye of the anthropoid apes**) finds that the ligamentum pectinatum of anthropoid apes is very thick as compared with that of man. Its trabeculæ reach into the anterior part of the ciliary body. This deep intrusion of Fontana's space into the ciliary body causes the smallness of the root of the iris. Corresponding to the richness in pigment of the eye the ciliary muscle is permeated with numerous pigment cells. The optic nerve shows in general a feebler and more irregular development of septa than in man. The distance from the entrance of the retinal vessels in the optic nerve from the lamina cribrosa varies from 3.96 to 5.94*mm*, in man it is 11*mm*. A physiological excavation is present. Hotta claims that Fuch's peripheric atrophy of the optic nerve is to be met with in apes. Investigation of the depigmented iris showed that Bruch's membrane held no embedded nuclei. The nuclei lying on the posterior surface of the membrane were separated from it by a clear zone, corresponding to the cell body, which is broader when the pupil is dilated that when it is contracted. Bruch's membrane is also broader when the pupil is dilated. The nuclei mentioned are oval and arranged in a radiating manner when

the pupil is contracted, roundish, pressed together, and arranged irregularly when it is dilated. Bruch's membrane is only a layer of contractile substance outside of which the nucleus is placed. When the muscle layer is stretched the nuclei approach the contractile substance, and when it is greatly stretched they seem to be embedded in it. Besides Bruch's membrane and the nuclei there is only a single layer of epithelium on the posterior surface of the iris. In an ape there is no muscular dilator and a double layer of epithelium.

According to HORNICKEL (762, **The histological formation of the lachrymal glands of the domestic animals**) the lachrymal glands of sheep and goats are divided by thin interlobar bands of connective tissue which are stronger in the horse and ass, better marked in cattle, dogs, and cats and best of all in swine. Elastic tissue is only sparsely present in the glandular capsule and in the interstitial tissue. There are no muscular bands and aggregations of lymph cells, such as are to be seen in human lachrymal glands. Fat cells are numerous in the interlobar septa in cattle, swine, and dogs, moderate in number in cats, few in horses, asses, sheep, and goats.

The intercalary portions of the secretory system are present in all the animals, while the secretory ducts are usually absent. Secretory passages are intraparenchymatous and interstitial. The epithelial lining of the acini is composed of pyramidal cells, in goats of cylindrical cells. Little drops of fat are constantly present in the cells, most numerous in dogs, fewest in cats. The lachrymal glands of the horses, cattle, and cats have the character of pure albuminous, of swine of mucous, and of sheep, goats, and dogs of mixed glands. Intercellular secretory capillaries are present in swine and dogs.

BERND (763, **The development of the pecten from the layers of the optic vesicle in the eye of the chicken**) claims that the pecten in the eyes of birds is not of purely mesodermal origin, as has been supposed, but that on the seventh day of incubation the mesodermic wedge which forms the basis of the pecten is covered by an ectodermal layer. This is brought about by the portion of the layers of the optic vesicle which form the margins of the ocular fissure superposing themselves over the wedge and closing the ocular fissure.

SCHUEPBACH (764, **Contribution to the anatomy and physiology of the ganglion cells in the central nervous system of pigeons**) could not find in the retinæ of birds the difference between conditions of adaptation to light and dark found by Birch-Hirschfeld in the cells of the retinæ of rabbits, with special reference to the chromatin.

MOST'S (765, **The lymph vessels and glands of the conjunctiva and lids**) results obtained from injected preparations of newly born infants are as follows: the conjunctival lymph vessels pass over into those of the skin of the lid at the lid margin. The efferent lymph vessels are superficial or deep according as they arise from the skin of the lid, or from the conjunctiva. Both are divided into a lateral and a median group, of which the lateral goes to the parotid region, the median to the submaxillary. All these lymph channels lead to the deep cervical glands which adjoin the internal jugular vein, chiefly at the level of the entrance of the facial.

MATYS (766, **The development of the lachrymal passages**) has shown by investigations on the Spermophilus citillus that the commencement of the lachrymal furrow takes place in the form of an epithelial proliferation from the epiblast of the upper inner margin of the process of the superior maxilla at the place of the later conjunctiva of the lower lid. By proliferation of the epithelium a crest is formed from which as a base an epithelial cord is developed in the direction of the lower lid, later to become the lower canaliculus, and also a cord-like proliferation to the upper lid to become the upper canaliculus. The lachrymal sac arises from the epithelial cord lying between the branching of the two canaliculi. The epithelial cord lying free in the mesoblast and growing toward the nose is the future nasolachrymal duct. After all parts of the lachrymal apparatus have been commenced they are shoved by the further development of the superior maxilla toward the inner canthus until they are placed in their proper position. A lumen appears first in the lower canaliculus, which is much thicker than the upper. The lachrymal gland arises from the epithelium of the conjunctiva of the upper lid; Harder's glands appear somewhat later. The primary commencement therefore corresponds to the lachrymal sac, from which the canaliculi and lachrymal duct develop secondarily.

ABELSDORFF (767, **Pigmentation of the optic nerve in animals**) notes that beside the pigmentation of the optic nerve in animals pictured by Ogawa there is a form which affects only the nerve head.

ABELSDORFF (768, **The eye of the new-born kitten, with special reference to the neuro-epithelial layer of the retina**) starts from the fact that the pupils of newly born kittens react to light. This is little in accord with the statement of Max Schultze that the retinæ of these animals contain no rods or cones. Microscopic examination showed that a zone free from rods and cones is present only in the periphery of the retina, that rudimentary rods are present in the posterior parts of the eye, but that a little central zone exists which contains clearly distinguishable rods and cones.

WOLFRUM (769, **Dry celloidin**) recommends for the preparation of thin celloidin sections to place the celloidin preparation hardened in chloroform vapor in equal parts of chloroform and cedar oil and after evaporation of the chloroform to cut the transparent preparation dry.

According to COATS (770, **The structure of the membrane of Bruch, and its relation to the formation of colloid excrescences**) the histological details of the colloid excrescences on the membrane of Bruch have been fairly well described, but there is still wanting a satisfactory explanation of their origin. There are two principal theories: (1) the transformation theory, according to which they are caused by a transformation of the pigment epithelium, and (2) the deposition theory according to which they result from an excretion of the pigment cells without any true transformation of the latter. Coats shows that Bruch's membrane, which appears homogeneous when stained with eosin, can be separated by a special staining into two layers, which indicates a separate origin for each. The fine elastic fibres in the outer layer are similar to the elastic fibres in the neighboring choroid and must have the same origin, while the inner homogeneous layer looks like a central product that originated from the pigment epithelium. It is very probable that the colloid excrescences arise only from the inner layer. This is also shown in sections colored with Weigert's elastic-tissue stain. Coats finally speaks in favor of the deposition theory, although both theories pre-

suppose an abnormal transformation of the pigment epithelium. A historical résumé of our knowledge of the anatomy of the colloid bodies and an exhaustive collation of the literature on the subject are given. DEVEREUX MARSHALL.

According to LODATO (771, **Il tessuto elastico dell' occhio umano durante la vita fetale**) the elastic tissue appears in the lid after the second month. The tarsus is richly furnished with elastic fibres. In the bulbar conjunctiva the elastic fibres appear between the second and third months. The conjunctival fornix receives its elastic fibres from the lids. They appear in the anterior section of the uvea in the course of the third month, and supply the entire capsulo-pupillary membrane, the vascular tunic of the lens, the angle of the anterior chamber, and the ciliary muscle. The iris contains no elastic constituents. In the deeper parts of the cornea the fibrillæ are more apparent and extend into the sclera. In the ciliary processes they are more numerous and extend into the processes themselves. Schlemm's canal is invested by elastic tissue in an embryo of eight months, the iris is still without fibres and Descemet's membrane appears as a thin strip. The elastic tissue in the iris develops after birth. The cornea appears to be wanting in elastic constituents. The elastic tissue appears in the sclera and choroid in the course of the third month. In the optic nerve the elastic constituents first appear in the fourth month in the sheath. Between the fifth and sixth months elastic fibres penetrate from the sclera, and later these unite with fibrillæ coming from the choroid and vessels to form the lamina cribrosa. In the lachrymal gland the absence was demonstrated of the intratubular elastic tissue which is present in adults.

CIRINCIONE.

MUENCH (772, **The innervation of the stroma cells of the iris**) distinguishes two types of cells in the iris, the stroma cells pigmented and with strong processes, and non-pigmented, small, roundish cells, poor in protoplasm and with large nuclei. The second type of cells the author denominated ganglion cells of the primitive type because he thinks they form nodal points of a fibrillary network which is a net of nerve fibres. These nerve fibres unite with the stroma cells (1) in a single contact, (2) in a way analogous to Ranvier's "taches notrices,"

(3) when a ganglion cell, adjacent to the stroma cell, itself forms the terminal swelling.

V.—PHYSIOLOGY.

773. FRANK, M. **Observations regarding the conformity of Hering-Hildebrand's declination of the horopter and Kundt's division experiment.** *Pflueger's Arch. f. d. ges. Physiol.*, 109, p. 63.

774. HESS, C. **Physiology and anatomy of the eyes of the cephalopods.** *Ibid.*, 109, p. 393.

775. SIVEN, V. O. **The retinal rods and cones as the medium for the reception of color impressions.** Skandinav. *Arch. f. Physiol.*, xvii., p. 306.

776. PIPER, H. **The electromotor behavior of the retina in warm-blooded animals.** *Arch. f. Anat. u. Physiol.*, Physiol. Abth., sup. p. 133.

777. HERZOG, H. **Experimental studies of the physiology of the movements in the retina.** *Ibid.*, p. 413.

778. DANILEWSKY. **Observations of a subjective light impression in variable magnetic fields.** *Ibid.*, p. 513.

779. STIGLER, R. **Entoptic perception of the retinal vessels.** *Zeitschr. f. Psychol. u. Physiol. d. Sinnesorg.*, 39, 4–5, p. 327.

780. GESZA, REVESZ. **Is the sensitiveness of an eye to light changed by a simultaneous irritation of the other eye by light?** *Ibid.*, p. 314.

781. STIGLER, R. **A new subjective optical phenomenon.** *Ibid.*, p. 322.

782. LORIA, STANISLAW. **Investigations of peripheral vision.** *Ibid.*, 40, 3, p. 160.

783. LOHMANN, W. **The emulation of the visual fields and its significance in plastic vision.** *Ibid.*, p. 187.

784. WESSELY, K. **The fluids and metabolism of the eye, with special reference to its relation to general physiologic and biologic questions.** *Ergebnisse der Physiologie*, iv., p. 565.

785. TSCHERMAK, A. **The bases of optic localization according to height and breadth.** *Ibid.*, p. 517.

786. ELSCHNIG. **Monocular stereoscopy and direct stereoscopic projection.** *Jahrbuch f. Photograph. u. Reproductionstechn. f. d. Jahr*, 1905.

787. TROMP, FRITZ. **The physiology of the motion of the iris.** *Inaug-Dissert.*, Marburg, 1905.

788. WEINHOLD. **A phenomenon of accommodation to be observed with the aid of a stenopaic slit.** *Klin. Monatsbl. f. Augenheilk.*, xliii., 267.

789. HAMBURGER, C. **Observations on the theory of direct vision.** *Ibid.*, Beilageheft, p. 106.

790. HEINE. L. **Perception and conception of differences of distance.** *Arch. f. Ophthalm.*, lxi., 3, p. 484.

791. WOELFFLIN, E. **The influence of age on the light sense of the eye adapted to the dark.** *Ibid.*, p. 524.

792. STERN, ROBERT. **Visual purple fixation.** *Ibid.*, p. 561.

793. SCHREIBER, L. **New observations regarding the pupillary reflex after section of the optic nerve in rabbits.** *Ibid.*, p. 570.

794. GULLSTRAND, A. **The color of the macula centralis retinæ.** *Ibid.*, lxii., 1, p. 1. Also lxii., 2, p. 378.

795. LEBER, ALFRED TH. **The metabolism of the crystalline lens.** *Ibid.*, lii., 1, p. 85.

796. POLACK, A. **Simultaneous contrast of colors.** *Compt. Rendu de l'Academie des Sciences de Paris*, July, 1905.

797. NUEL, JUN. **The molecular concentration of the intraocular fluids in the normal and pathological states.** *Soc. Belge d'ophtal.*, June 11, 1905.

798. AGADSCHARIANZ. **The cortical visual centre.** *Obosren Psychiatr. i. Neurolog.*, 1904, 6.

799. COLLINS, E. TREACHER. **On the development of the accommodative power of the human lens.** *Royal London Ophth. Hosp. Reports*, xvi., part 2.

800. OVIO, G. **Movimenti pupillaria, intensita luminosa, accommodazione.** *Annali di ottolmologia*, 1905, 102–146.

801. RE, F. **Sulle modificazioni fisiche e chimiche della retina per l'eccitazione elettrica dell' encefalo, mesencefalo e chiasma.** *Archivio di ottolmologia*, xii., 3–4.

According to E. HERING (773, **Observations regarding the conformity of Hering-Hildebrand's declination of the horopter and Kuhnt's division experiment**) on placing plumb lines in an apparent plane this is brought in near vision into a cylindrical surface slightly concave toward the observer. From this taken as the empirical determination of the longitudinal horopter Hering concludes that the corresponding retinal elements do not lie exactly congruent, but that the separation of the elements is less on the temporal side of the retina than on the nasal. Kuhnt's division experiment supports this declination of the horopter. If a horizontal distance is halved and one eye only is fixed on the middle point the outer half appears somewhat greater than the inner. Frank has demonstrated the conformity of this declination of the horopter with Kuhnt's experiment by experiments under the same conditions. Three black hairs with weights are so placed that they appear to the observer as three fine black lines equally far apart on a white surface and remove the empirical motive for the localization of depth from the experimenter 30 or 40*cm* distant. In the first, binocular, experiments the three hairs were so placed that they appeared equidistant

in one and the same frontal plane (empirical longitudinal horopter), in the second, monocular, experiments a lateral thread was moved to the same apparent distance from the fixed middle thread as the other lateral thread which was also fixed in position. The results of both showed the incongruence in favor of the nasal part of the retina. The author sees in this demonstration a basal argument in favor of the subjective physiology of sense.

Hess (774, **Physiology and anatomy of the eyes of the cephalopods**) claims that the retina of a cephalopod contains a highly light receptive coloring matter resembling the visual purple of vertebrates. He overcame the difficulty met with in investigation of the visual purple in cephalopods through the presence of pigment in the layer of rods in various ways. Like the visual purple of vertebrates it is not materially injured by post-mortem changes, but unlike the former is changed by the prolonged action of alum. Sodium taurocholate dissolved the rods, but solutions of the purple could not be made because of the great mixture with pigment.

The pigment changes in the eyes of cephalopods usually take place in this manner: on illumination, first the pigment in the lower, then in the peripheral parts of the upper, portion of the retina move forward, so that the middle may appear as a bright gray strip with dark surroundings. The migration of the pigment follows over the inner surface of the retina to its contact with the hyaloid. Within the retinal strip of clearest vision, where the rods are longer and finer than in its neighborhood, the migration of the pigment in the light is slower, and its return in darkness quicker than in the rest of the retina.

Siven (775, **The retinal rods and cones as the medium for the reception of color impressions**) does not ascribe exclusively colorless impressions to the rods, although in a faint light light perception seems to be the only function of the rods, because with a stronger illumination color impressions are made by the short-waved rays. The author finds support for this theory in the appearance of the slightly illuminated spectrum, the width of the visual field for different colors, Purkinje's phenomenon, the blue blindness of hemeralopes, the violet blindness and greenish yellow vision with the ex-

clusion of the macula region in santonin poisoning, and in the fact that he cannot perceive spectral violet by foveal observation. The cause of the slight receptivity of the retinal centre for short-waved light the author considers not to be absorption through the pigment of the macula because this is not present, the yellow staining of the macula being according to Gullstrand a cadaveric sign. He ascribes the violet blindness of the macula rather to the slight sensitiveness of the cones to light of short waves and the absence of rods in this place. He ascribes to the cones the special perception of long waves of light and their complementary colors and calls them the red-green perceiving apparatus. The rods he calls the blue-yellow perceiving apparatus as they specially receive impressions from light of short waves and their complementary colors. Perception of white is due to both the rods and the cones, while that of black is not a perception in the true sense, but a simple recognition of deficiency.

Piper (776, **The electromotor behavior of the retina in warm-blooded animals**) has investigated the direction and time of the electric retinal current and also measured the relative stimulant values of homogeneous lights by the electromotor force. He used a Deprey d'Arsonval galvanometer to determine the direction of the current as well as the values of homogeneous lights coming from the dispersion spectrum of a Nernst light, and a capillary electrometer for the registration of the proportionate variations of the current and to determine the latent stage. The curarized animals were placed in a dark box with a fissure covered with ground glass for the entrance of the light employed. The experiments were performed on day birds—buzzards, hens, and pigeons; night birds—owls, dogs, cats, and rabbits. The electromotor reaction of the retina to the exposure appeared in the form of a positive variation of the dark current from the cornea to the posterior pole of the eye. The positive variation is to be considered the normal reaction to exposure to the rays. In injured eyes the transition from the positive to the negative variation is to be observed, and the rapid subsidence of the electromotor force is also to be seen in the retinal cones of buzzards and pigeons, which possibly are particularly sensitive to the influence. The period of latency between the moment of stimu-

lation and the beginning of the photo-electric reaction is in birds from 2/100 to 3/100 of a second, in mammals about twice as long. It is markedly prolonged by injurious influences. Judging from this it would appear that the seat of the photo-electric process is in the sensitive epithelium of the retina. The retinal reaction to darkness showed a negative variation, instead of positive as in frogs, and from this the original value of the dark current was obtained. There was a characteristic difference between the values of the currents obtained through homogeneous lights in day and night birds. The maximal value appeared in the retinas of day birds on stimulation with the long-waved rays of the Nernst light spectrum and was markedly less on stimulation with the green and blue rays, while in night birds the green rays excited the maximal activity and the long-waved rays had relatively less effect. The curve of the stimulant value for the rods of night birds coincides with the absorption curve of the visual purple. No modification of the relative stimulant value of homogeneous lights in the sense of light and dark adaptation was shown. Yet the rods of the night birds were more suited to a condition of increased sensitiveness in the dark than the retinal cones of the day birds through the increase in reaction. In mammals the division of the electromotor stimulant values of spectral lights corresponded with that found in birds. It was independent of changes of conditions of adaptation of the retina and of the strength of stimulation, and showed the division of "dusk value" known in human physiology. The author gives the explanation that the animals under investigation have relatively few cones, that the electrodes adjoined the peripheric regions which are poor in cones, and the tapetum favored the action of green light.

HERZOG'S (777, **Experimental studies of the physiology of the movements in the retina**) experiments were performed entirely on frogs. In addition to the known retinomotor influences of light and darkness the following was learned. Destruction of the brain and spinal cord brought about the maximal light position of the cones, so the author postulates for the myoid of the cones a tonus emanating from the central nervous system. Warmth and refrigeration act alike. Temperatures

of from 21° to 32° C. cause the same as one of 0° advance of the pigment and contraction of the cones, and perhaps the latter hastens the former. Also after the conclusion of the refrigeration the movement increases and reaches its maximum an hour later. The prolonged tying up of a frog has the same influence on the cone and pigment movement as cold, warmth, and light. In a second series of experiments the influence of the time, intensity, and quality of the exposure was determined. An exposure of moderate intensity for about 2½ minutes was necessary to induce the maximum contraction of the cones, while momentary illumination or exposure for half a minute produced no recognizable effect. Exposure to red, green, and blue rays produced with an increasing intensity an increase in the contraction of the cones. Blue violet rays produced a higher degree of contraction than red in the same time and the same or weaker intensity of exposure.

Danilewsky (778, **Observations of a subjective light impression in variable magnetic fields**) confirms the observation made by E. K. Mueller, that a fluttering appears in the periphery of the visual field in the form of concentric, wavelike light movements in a strongly variable magnetic field in the open eye which has been brought sufficiently near the radiator. He believes that the cause of the light perception lies in the magnetic energy, while perhaps a clonic contraction of the ciliary muscle and an intermittent mechanical dragging on the peripheral portions of the retina may be produced by the induced stimulation.

Stigler (779, **Entoptic perception of the retinal vessels**) looked upward beneath the closed lids, the eyes turned toward a source of light, drew the lower lid down so as to uncover a part of the pupil, and then saw the shadow of his own retinal vessels which quickly disappeared. He also saw the figure of the veins when with one eye closed he looked with the other at the bright sky and made pressure at the outer or inner canthus on the open eye synchronously with the beat of the heart, pressing with the systole and removing the pressure with the diastole. A third method consisted in turning both closed eyes toward a light, covering one with the hand, and making a slight pressure upon this at the outer canthus. The vessels, particularly those about the fovea,

appear then as yellow on a black ground. The mechanical irritation of the obstructed vessels makes them visible in the dull light.

The experiments undertaken by REVESZ (780, **Is the sensitiveness of an eye to light changed by a simultaneous irritation of the other eye by light?**) allowed light to be conveyed to the two eyes independently of each other. After maximal adaptation to the dark the liminal value of one eye would be fixed with the other eye kept in darkness and then redetermined when the second eye was stimulated by a certain intensity of light. The results did not show that the liminal value in the one eye underwent any legitimate change from the action of light stimulation of the other, and a relation between the conditions of stimulation of the two eyes was not demonstrable.

STIGLER (781, **New subjective optical phenomenon**) observed the following phenomenon when the resting eye had been subjected for some time to not dazzling daylight the intensity of which was suddenly diminished. An impression of the retinal vessels appeared over the entire field of vision as a delicate silvery network with polygonal meshes and dark, arch-shaped bands in the periphery. Without going into the anatomical basis of this phenomenon, the author thinks it probable that the functional hyperæmia of the vessels caused by the stimulation of light plays a part in its origin.

LORIA'S (782, **Investigations of peripheral vision**) investigations follow the observations of Heinrich that the accommodation changes in contemplation of peripheral objects although the distance to them remains the same as that to the central object. Loria finds that the accommodation of the eye to paraxial distances is dependent on the position of the object and independent of the distance of the central point of fixation. He also finds that the eye is very myopic paraxially and that the myopia increases with the angle of the paraxial position. The accommodation decreases with the angle of the paraxial position. All axial and paraxial objects which lie in different points in a line of accommodation are simultaneously clearly visible, but the author adds that not all objects are equally clearly visible, because the objects in the periphery are inferior in clearness to those in the centre.

In the so-called emulation of the visual fields there is according to LOHMANN (783, **The emulation of the visual fields and its significance in plastic vision**) a difference between the fixation point and the periphery. In the fixation point appear two different objects presented by the individual eyes under and through each other, while in peripheral vision one image yields to the other. This property of the emulation takes part in plastic vision as in addition to the impression of the place of clearest vision which is about the fixation point in both fields the phenomena of the parallel axis are called forth and the impression of materiality made.

WESSELY'S (784, **The fluids and metabolism of the eye with special reference to its relation to general physiologic and biologic questions**) article is under two heads: (1) the relations of the intraocular fluid changes to the general theory of secretion and absorption; (2) the relations of the nutrition of the transparent tissue of the eye to the general nutrition.

TSCHERMAK (785, **The bases of optic localization according to height and breadth**) gives an analysis in which he rests upon subjective methods of observation. The retinal incongruences *i. e.*, the contradictions between the geometrical position and the local signs of the individual retinal elements are divided into discrepancies of distance and direction. Their explanation carries Tschermak to the perception that the retinal elements physiologically have the sense of form but not of size. The labyrinth has an associated influence on the sometimes changing value of the retinal vertical or horizontal meridians. Though the eye muscles cause no consciousness of the position of our eyes yet they are not lacking in a sensory part, because the quality "apparently directly in front" is connected with symmetric convergence and "apparently at the height of the eyes" with a certain moderate lowering of the visual plane. A congenital basis is postulated for these physiological factors which belong to both binocular and monocular localization from height and breadth.

ELSCHNIG (786, **Monocular stereoscopy and direct stereoscopic projection**) describes the stroboscopic phenomena simultaneously found by Straub and Brown which call forth an apparent monocular stereoscopic vision. He emphasizes

that stereoscopic vision by means of simulated parallel axes is only simulated, as this stereoscopy very often clearly inverts itself and accordingly is to be classed with optical illusions. Good kinematographic pictures simulate stereoscopic vision, but will not stand comparison with true stereoscopic pictures.

WEINHOLD (788, **A phenomenon of accommodation to be observed with the aid of a stenopaic slit**) says that objects seen through a stenopaic slit appear smaller than they should at a certain distance under strong accommodation, and larger when the accommodation is relaxed. A lateral movement of the slit causes a parallactic movement of the object in the same direction as the slit when the eye is strongly accommodated, in the opposite direction when the accommodation is relaxed. He explains these movements by the change in position of the cardinal points of the eye during accommodation.

HAMBURGER (789, **Observations on the theory of direct vision**) says that after-images totally invert themselves when after fixation of a suitable object one tries to make them. Although this phenomenon is easily explainable by the projection theory it is incompatible with Aubert's phenomenon. The projection theory is strikingly gainsaid by Stratton's experiment in which after closure of one eye upright images are produced on the retina of the other eye by a pair of suitable lenses and after a few days the objects appear no longer inverted but upright. That infants do not see objects at first inverted and learn to see them upright by experience was shown by experiments on animals. Guinea-pigs and chickens born and kept for several days in the dark were able without practice to roam about without making errors. When the writer finds strange the recently advanced view that the problem of upright vision in spite of inverted retinal images is no problem at all, the words of Berkeley in the beginning of the eighteenth century may be recalled: "we imagine ourselves looking on the fundus of another's eye" when we speak of the problem of the inverted retinal image.

HEINE (790, **Perception and conception of differences of distance**) found (1) in an absolutely dark room the difference in distance of two punctate objects placed one nearer than

the other was correctly perceived with binocular vision on momentary illumination. (2) This difference was not perceived monocularly but was obtained by prolonged observation and lateral movements of the head or body through the parallactic motion. The conception thus obtained may be erroneous. While the binocular perception of differences of distance is a simple centripetal process of the senses without presupposition, the monocular recognition of differences of distance by lateral movements of the head or body is made under the supposition that the objects remain still and the condition of known change in the position of our standpoint. Among such conceptions belong the recognition of differences of level in the fundus with the aid of the parallactic motion in the upright and inverted images. That this conception is not infallible is shown by the fact that the glaucomatous papilla was at first thought to be prominent because of its parallactic motion in the inverted image. The stroboscopic apparent movements termed by Straub monocular stereoscopic, *i. e.*, monocular stereoscopic vision in the stroboscope, he considers an illusion. The apparent movements of stereoscopic pictures he considers psychical if produced by the voluntary change of standpoint of the observer, and partly at least explainable geometrically when due to the turning of the picture itself.

Woelfflin (791, **The influence of age on the light sense of the eye adapted to the dark**) examined 100 persons from 20 to 70 years of age with healthy eyes adapted to the dark. After half an hour in a dark room he determined the minimal light stimulus with the aid of ground glasses and a diaphragm in the intensity of various sources of light. The average value showed that a true influence on adaptation could not be ascribed to age. There was no difference between the most sensitive places in the upper and lower parts of the retina. The liminal value was not increased in myopes. Adaptation was very slow in blondes, very quick in brunettes with greater sensitiveness to light. He did not confirm Piper's statement that the binocular light perceptive value is double the monocular.

Stern (792, **Visual purple fixation**) recommends in order to study the visual purple in microscopic sections to fix the

retina in a 25 % platinic chloride solution and embed in paraffin. The outer ends of the purple holding rods are then stained orange, while rods from clear eyes are colorless. The stain is almost insensitive to light.

SCHREIBER (793, **New observations regarding the pupillary reflex after section of the optic nerve in rabbits**) does not confirm Marenghi's statement that the reaction of the pupil to light is preserved in rabbits after intracranial section of the optic nerve, but he found the following reflex. In 26 rabbits the optic nerve was divided, in 3 intracranially. In these 3 and in 9 in which it was divided in the orbit when the rabbits were energetically seized by the roots of the ears the pupils of the affected eyes underwent a distinct though slow contraction. In all the eyes which showed this ear-pupillary reflex irritation of the cornea, passive opening and closing of the eyes and luxation of the globe induced a contraction of the sphincter iridis, which was in no way connected with a reaction to light. The maximal dilatation of the previously contracted pupil could be obtained in rabbits with divided optic nerves by slapping the abdomen with the open hand.

GULLSTRAND'S (794, **The color of the macula centralis retinæ**) demonstrations that the macula lutea is a cadaveric appearance and that in the living eye there is no yellow coloring matter in the layers of the central part of the retina in front of the membrana limitans externa are of a threefold nature.

1. Ophthalmoscopic observation: The physical conditions for the visibility in the living eye of the supposed yellow color are just as favorable as in the cadaveric opacity of the retina if one examines strongly pigmented eyes with daylight, or with a light which contains no red rays but is very strong in the yellow portion of the spectrum, yet no trace of color is perceptible, and none in fresh cases of acute ischæmia of the retina.

2. Entoptic investigations and color mixtures: The entoptic picture of the macula is separated by parallax from that of the fovea and the origin of the former is shown to be in the layer of sensory epithelium, that of the latter to be on the membrana limitans interna. Both in monochromatic and in mixed lights the macula appears entoptically as blue on a green ground, an appearance which cannot depend on

absorption by a yellow pigment. Haidinger's polarization bundles cannot be explained by double refraction on Mueller's base fibres saturated with yellow coloring matter, because then the polarization bundles must at least show the same parallactic motion as the deepest lying capillaries, but if they show no such motion, their cause is to be sought in the layer of sensory epithelium. A quantitative investigation shows a power of absorption of the terminal light at the macula difficult to reconcile with the presence of a yellow pigment. Further the determination of the complementary colors for an unchangeable, reproducible white light gives a true difference for small and large fields. The physical explanation of these things does not favor the theory of a special coloring matter.

3. Anatomical investigation: The yellow color of the macula centralis retinæ in the enucleated eye is a cadaveric appearance which is produced by the tearing off of the epithelial processes, or the separation of the same by fluid imbibed by the retina. When the loosening of the retina has taken place without any force, no trace of the typical cadaveric macula is to be found.

LEBER'S (795, **The metabolism of the crystalline lens**) investigations regarding the entrance of inorganic and organic substances into the lens were made in living animals in this way: The lenses of oxen were placed in equimolecular solutions of the various substances, removed from the same at corresponding intervals, washed with isotonic salt solutions, frozen and examined chemically, the cortex and nucleus separately. Of the inorganic salts chloride of lithium penetrated the most easily, then followed potassic iodide, sodic iodide, manganese chloride, rhodanammonium, and finally potassic ferrocyanide. The organic substances exhibited considerable differences in their behavior. Of the carbohydrates glycogen did not enter the lens at all and there was no deep penetration of amylodextrin after 12 hours. Grape sugar entered the lens with ease. Cane sugar in small quantity during the first 12 hours, more rapidly in the succeeding 12 hours. Of the albuminous bodies hemoglobin penetrated only the outermost layer of the cortical, pepton did not enter at all, while gluten entered clearly. Isotonic solutions of fluorescin, indigo,

carmine, etc., showed that the lens possesses little or no diffusion power. Certain fatty solvents, such as chloroform, phenol, aceton, and anilin, quickly penetrate into the central part of the lens, while the likewise fatty solvent naphthaline and β-naphthol do not.

The author suggests the possibility that the senile lens, because it contains an increased amount of lecithin, cholestearin and other lipoids, is more fitted for the admission of fatty solvent substances in metabolism and that these substances become of consequence in the origin of senile cataract.

POLACK (796, **Simultaneous contrast of colors**) traces the appearance of simultaneous color contrasts to the chromatic aberration of the eye. They cannot be explained as after images because their perception requires an illumination which lasts only 0.1 of a second. BERGER.

NUEL (797, **The molecular concentration of the intraocular fluids in the normal and pathological states**) investigated the molecular concentration of the intraocular fluids in normal and pathological conditions, using Hamburger's method of hemolysis. He found it about the same as that of the blood serum, or but little weaker. In two glaucomatous eyes it was a little less than that of the blood serum. Consequently in these cases the hydrostatic hypertony of the eye cannot be the result of a preponderance of the osmotic pressure of the intraocular fluids over that of the blood plasma. Demarest obtained the same result from an examination of two glaucomatous eyes in 1904, and therefore the theory of glaucoma which ascribes the increased intraocular tension to increased osmosis is incorrect. BERGER.

According to AGADSCHARIANZ (798, **The cortical visual centre**) the visual centre is situated on the inner side of the occipital lobe and the centre of clear vision in front of the centre corresponding to the rest of the retina. These two centres can be affected separately. In organic affections of the cortex the eye becomes at once blind to all colors. Organic affection of the cortex do not produce complete blindness either on the affected or on the opposite side, at least in dogs, apes, and man. HIRSCHMANN.

As Helmholtz has shown, the power of accommodation of

the lens is through the elastic fibres which are in a state of tension. By a relaxation of this tension an increase of the curvature of the surface of the lens is produced. TREACHER COLLINS (799, **On the development of the accommodative power of the human lens**) shows how this condition of tension is developed. He shows that different parts of the ciliary body come in contact at different times during its development with the lateral portions of the lens and that adhesions between them must take place at different times. With the growth of the eye the ciliary body becomes removed from the lens and this causes a tension on the fibres and a marked pull on the capsule. A part of the fibres try to draw the capsule forward and outward, another part backward and outward. The effect on the elastic fibres of the lens is that they become more and more bent and remain in a state of tension.

DEVEREUX MARSHALL.

OVIO (800, **Pupillary movements and luminous intensity**) has undertaken to solve the complicated problem of the existence of a relation between the diameter of the pupil and the intensity of the light. From the classical researches of Lambert he deduces the law that the increase of the pupillary surface in relation to its initial surface is inversely proportional to the square root of the light strength. Like Lambert the author used daylight in his experiments. He arrived at the following conclusions. The variations of the pupillary surface from the initial surface are inversely proportional to the square root of the light strength. The pupillary variations are not uniform for uniform variations in the light strength, but gradually become slower as the intensity is increased. Within certain limits the pupillary reaction depends exclusively upon the quantity of light which strikes the retina whether applied to a small, or scattered over a large surface. The same quantity of light produces a greater reaction when it falls on the central part of the retina than when it falls on the peripheral part. The pupillary variations from accommodation are not proportionate to the light strength, yet are modified by it. If the pupil is acted upon simultaneously by light and accommodation the latter predominates so that the pupil is small even with weak illumination. There is no true relation between troubles of the

accommodation and the pupillary changes; nevertheless the corresponding pupillary surfaces are in constant proportion to each other in consequence of equal variations of accommodation. The pupils react to isolated accommodation, not accompanied by convergence of the visual axes, and also to isolated convergence, not accompanied by accommodation. The reaction to convergence appears to be greater than that to accommodation.

Starting from the existence of centrifugal fibres in the optic nerve, RE (801, **Sulle modificazioni fisiche e chimiche della retina per l'eccitazione elettrica dell' encefalo, mesencefalo e chiasma**) has tried to show the behavior of the periphery during electric excitation of the centre. He found that electric excitation of the cortex of the posterior lobe produced no reaction in the retina. Electric excitation of the optic lobe caused a reaction. Direct excitation of the chiasm induced a complete reaction. By a second series of experiments he found that the electric excitation of the chiasm produced a greater acidity of the retina than excitation of the optic lobe, that excitation of the optic lobe produced a greater acidity of the retina than excitation of the cortex, and that excitation of the cortex induced no reaction different from those observed in the retinæ of the animals used as controls.

CIRINCIONE.

VI.—REFRACTION AND ACCOMMODATION.

802. THORNER, W. **The operation for high myopia.** *Charité Annalen*, xxix.

803. FEILCHENFELD, H. **The stereoscopic accessory action of cylindric glasses placed with symmetrical axes.** *Arch. f. Augenh.*, liii., 1, p. 57.

804. WEIDLICH, J. **The relations of diffuse opacities of the transparent media of the eye and irregular astigmatism to differences in the reduction of vision for objects placed at different distances.** *Ibid.*, liii., 2, p. 174.

805. SCHWARZ, O. **Diagnosis of latent paresis of the accommodation.** *Ibid.*, p. 363.

806. STILLING, J. **Anatomy of the myopic eye.** *Zeitsch. f. Augenheilk.*, xiv., 1, p. 23.

807. HAMBURGER, C. **Stilling's theory and how its author defends it.** *Ophthalmolog. Klinik*, Nos. 18 and 19.

808. WEINHOLD, M., **Theory of sciascopic shadow rotation in astigmatism.** *Arch. f. Ophthalm.*, lxii., 2, p. 275.

809. HUBER, F. **Late results of the myopia operation.** *Beitraege zur Augenheilk.*, 64, p. 1.

810. OTTE, A. **Clinical and statistical contributions to the study of myopia.** *Inaug. Dissert.*, Giessen, 1905.

811. FRENKEL, H. **Traumatic myopia.** *Annales d'oculistique*, cxxxiv., 1.

812. VACHER and BAILLART. **Second note in regard to the influence of the total correction of the myopia over its progression and over detachment of the retina.** *Ibid.*, p. 330.

813. NUEL. **Etiology and pathogeny of certain irregular astigmatisms of the lens.** *Revue générale d'ophtalmologie*, xxiv., p. 337.

814. BARNES, J. L. **Removal of the lens in myopia.** *Medical Record*, June 17, 1905.

815. CLAIBORNE, J. H. **The axis of astigmatism.** *Jour. of the Amer. Med. Assn.*, Feb. 4, 1905.

816. BLACK, N. M. **The relation of the curvature of the cornea to the refraction.** *Ibid.*, Feb. 4, 1905.

817. PERCIVAL, A. S. **Correction of astigmatism by tilting lenses.** *Ophthalmoscope*, June, 1905.

818. GOULD, G. M. **The etiology of astigmatism.** *Annals of Ophthalm.*, July, 1905.

819. EATON, F. B. **Experimental and clinical evidence of dynamic (spastic) astigmatism.** *Jour. Amer. Med. Assn.*, Aug. 26, 1905.

820. BRUNS, H. D. **Change in astigmatism produced by chalazion.** *Ophthalmic Record*, Sept., 1905.

821. CHIARI, C. **Contributo allo studio delle modificazioni delle curve corneali in rapporto alle contrazioni dei muscoli.** *Annali di ottalm.*, xxxiv., p. 286.

822. DE LIETO VOLLARO. **Agostino, Contributo all esame della rifrazione oculare per mezzo del punto luminoso.** *Arch. di ottalm.*, xii., ii., 9–10.

THORNER (802, **Operation for high myopia**) reports 17 cases of operation for myopia. In 9 he obtained a bad result. Detachment of the retina occurred 5 times, in one the patient had detachment in the non-operated eye, in one case of seclusion and occlusion of the pupil there was probably a detachment before operation, in one phthisis bulbi resulted from a purulent infection, and in one vision was reduced to movements of the hand by a central choroiditis. The particularly unfavorable results are explained by the fact that the cases were retained under treatment at the Berliner Charité and in part of them the complications first appeared years after the operation. Thorner concludes that the danger of detachment of the retina is increased by the operation and thinks that very myopic eyes are so injured in their nutritive

conditions that germs of infection find in them more favorable media than after ordinary cataract extraction. The operation should be confined to patients who are unable to do their work even with the aid of correcting lenses.

FEILCHENFELD (803, **The stereoscopic accessory action of cylindric glasses placed with symmetrical axes**) speaks of cylindric glasses placed with oblique axes to correct the corresponding astigmatism. When the axes are directed from above and inward, downward, and outward, or the reverse, with concave cylinders, the ground seems to rise or fall. This is because not exactly corresponding places on the two retinæ are affected and the image is distorted because increased or diminished in size by the cylinders in two meridians perpendicular to each other. As the distortion is greatest at 45° the author recommends that when strong cylinders of 45° are needed the axes should be brought nearer the horizontal for convex glasses, nearer the vertical for concave. Aside from this, cylindric glasses should be brought as close as possible and carefully centred in order to avoid distortion of the image.

WEIDLICH (804, **The relations of diffuse opacities of the transparent media of the eye and irregular astigmatism to differences in the reduction of vision for objects placed at different distances**) says that with diffuse opacities and irregular astigmatism various circumstances combine to make distant vision appear relatively less than near. In near vision the distance of the nodal point from the retina increases the size of the retinal pictures. As relatively less light enters the eye from more distant light points the diminished light intensity must be equalized by enlargement of the image.

SCHWARZ (805, **Diagnosis of latent paresis of the accommodation**) recommends for the detection of monolateral latent paresis of the accommodation that each eye should fix on a certain object in turn while in turn each eye is covered. When the paretic eye undertakes to fix, the increased accommodative effort induces a contraction of the pupil of the sound eye which yields to a dilatation when the sound eye fixes.

The measurements made by STILLING (806, **Anatomy of the myopic eye**) on an eye myopic about 4 D., an emmetropic eye, and an eye hypermetropic 2 D., showed that the sclera of the non-myopic eyes was thinner than that of the myopic. The

examination of 6 myopic eyes, the length of which deviated only slightly from the normal, showed that the sclera increased in thickness from the equator toward the pole. Stilling believes that myopic eyes are large normal eyes the length of which has been increased by the muscle pressure; whether they are myopic depends on the curvature of the cornea. The thickness of the sclera he thinks has nothing to do with the development of myopia during near-work.

HAMBURGER (807, **Stilling's theory and how its author defends it**) again points out the inaccuracy of Stilling's orbital measurements and the insufficiency of the groove produced by the pressure of the obliquus superior on the cadaveric eye as a basis for the compression theory.

WEINHOLD (808, **Theory of sciascopic shadow rotation in astigmatism**) discusses the fact that in skiascopy of astigmatic eyes with oblique axes the direction of the margin of the shadow does not usually agree with the direction of the axis of the movement of the mirror and is changed by the interposition of various spherical lenses. He corrects the astigmatism by a cylindric glass and asks how the border line between the lighted and the unlighted portion of the retina appears through such a cylinder. He shows that all lines which are not parallel or perpendicular to the axis of the cylinder appear to turn about a certain angle. The rotation of the shadow in skiascopy of astigmatic eyes with oblique axes is only a special example of this appearance.

HUBER (809 **Late results of the myopia operation**) reports 90 patients with 100 eyes on which the operation for myopia had been performed; 56 were women, 34 men, 80 were monolateral, 10 bilateral. Most of the operations were performed between the ages of eleven and thirty. After discission of the lens the swollen lenticular masses were allowed to escape and usually a final discission was performed. Before the operation the vision was from 0.1 to 0.25, immediately after its performance from 0.25 to 0.5, and at the last examination, from 2 to 12 years after the operation in 75 of the eyes, it was from 0.5 to 0.75. Vision was lost in 8 %. In 11, 14.67 %, new macula diseases were observed, which exceeded the number of diseases of the macula in eyes not operated on. 16% exhibited fresh opacities of the vitreous, about double the

number of vitreous opacities in non-operated eyes. Retinal hemorrhages occurred in 12%, including 2 cases of traumatic hemorrhage, against 3.51% in eyes not operated on. Retinal detachment occurred 5 times after operation, including 2 traumatic, while none occurred in the non-operated eyes. In two of the eyes operated on optic atrophy developed, in 1 glaucoma, in 1 septic infection. The refraction of the eyes operated on was from 12 to 30 D. of myopia. In the course of time 23 eyes became emmetropic, 12 myopic, and 34 hypermetropic. The number of emmetropic eyes almost doubled in the course of time, the hypermetropia diminished, and the number of myopes increased. In 37 eyes there was an average increase of myopia of from 1 to 3 D. The results lead Huber to the conclusion that the removal of the lens is not a certain palliative against the progress of myopia and its disastrous consequences, but such eyes remain as vulnerable as ever.

Otte (810, **Clinical and statistical contributions to the study of myopia**) presents the statistics of 6006 cases of myopia observed in the clinic at Giessen between 1879 and 1899. The number of males was about double that of females. Nearly three times as many men as women had low degrees of myopia, while a myopia of 5 D. or more was proportionately more frequent in women. That near-work is not the only factor in the production of high myopia is shown by the division of myopia among the various callings; myopia of low degree is more frequently found among those who do near-work, that of higher degree more frequently among those who do not do near-work. 64.93% of all the cases had complications, viz., vitreous opacities in 3.29%, detachment of the retina in 0.44%, choroiditis in 4.71%, conus in 17.37%, divergent strabismus in 3.29%, convergent strabismus in 0.42%. In the higher degrees of myopia the complications were disproportionately frequent. By far the greater part of the complications, 72.53%, occurred in persons who did not do near-work, and only 27.47% among near-workers. In the higher degrees of myopia those who did not do near-work were the more subject to complications, in the lower degrees this was reversed.

Frenkel (811, **Traumatic myopia**) divides traumatic myopia into four groups, spastic myopia, myopia in consequence of

relaxation of the zonula, myopia in consequence of subluxation or luxation of the lens, myopia in consequence of a lengthening of the axis of the eyeball, the result of an inflammatory process in the posterior part of the globe. It is incorrect to consider traumatic myopia as a curiosity. Prognosis is most favorable when the myopia is due to spasm of the accommodation, least favorable when due to subluxation or luxation of the lens, because of the danger of complication with glaucoma. BERGER.

VACHER and BAILLART (812, **Second note in regard to the influence of the total correction of the myopia over its progression and over detachment of the retina**) are of the opinion that full correction should be given to those myopes alone in whom no fundus changes are present. Whether the full correction of myopia hinders or favors the occurrence of detachment of the retina they are not yet ready to say. Out of the 55 cases of retinal detachment which they studied, in only one, a man eighteen years old, had the myopia been fully corrected before the commencement of the retinal detachment. BERGER.

NUEL (813, **Etiology and pathogeny of certain irregular astigmatisms of the lens**) studied four cases of irregular astigmatism of the lens. In each a conjunctival catarrh preceded. Nuel thinks that during the latter disease phlogogenous substances passed into the anterior chamber and through the lens capsule, where by their irritation they caused irregular signs of proliferation of the lens fibres which produced astigmatism and central anterior capsular cataract. The latter may occur without any perforation of the cornea. Very careful cleansing of the conjunctival sac is the best prophylaxis. BERGER.

BARNES (814, **Removal of the lens in myopia**) gives a careful review of our present knowledge in regard to the operative treatment of high myopia. He reports the case of a girl 16 years old operated on by him. Before the operation the vision of the right eye was 20/70 with − 20− 1 cyl., of the left 20/70 with − 22− 1 cyl. The transparent lens was removed by linear extraction. The second eye became infected and produced a membrane which was needled. Final result R.V. 20/30 with − 2− 1 cyl., L.V. 20/30 with − 1. An inter-

esting point is that after the operation a convergent strabismus of the left eye appeared. ALLING.

CLAIBORNE (815, **Axis of astigmatism**) refers to the known fact that in the great majority of cases the axis of hypermetropic astigmatism lies between 45° and 135°, while in myopic astigmatism it lies between 15° and 165°. He adds from personal observation that the preferred axes of the former are at exactly 90°, 105°, and 135°, of the latter at 180°, 15°, and 165°. The position of the axis is thus governed by the law of multiples, 15° being the smallest. The demonstration of this is purely empirical. ALLING.

The statistical results given by BLACK (816, **Relation of the curvature of the cornea to the refraction**) from 2092 measurements of the cornea show an evident correlation between the corneal curvature and the refraction of the eye. He says that as a rule a long corneal radius corresponds to hypermetropia, a shorter one to myopia, according to its degree. ALLING.

PERCIVAL (817, **Correction of astigmatism by tilting lenses**) claims that in order to correct the astigmatism which so frequently remains after an extraction of cataract the proper convex glasses may be tilted forward for patients who are unable to pay for the expensive combined glasses. The same effect is obtained as through a sphero-cylindric combination. Thus if a convex lens of 10 D. is inclined forward 24° its effect is almost exactly the same as that of a +10.5 sph. +2.5 D. axis horizontal. A table is added which shows the required tilting of the lens for different degrees of astigmatism.

DEVEREUX MARSHALL.

GOULD (818, **Etiology of astigmatism**) advances as the cause of astigmatism the well-known theory of lid pressure and explains oblique axes by influence of modifying agents such as irregular action or insertion of the external muscles. ALLING.

EATON [819, **Experimental and clinical evidence of dynamic (spastic) astigmatism**] asserts his belief in dynamic astigmatism and offers in evidence the behavior of his own eyes. While wearing his correction for +0.75 D. astigmatism he sees all the lines on the astigmatic chart equally well. If he now adds a minus 3 D. sphere before one eye and overcomes its

effect by accommodation he finds an astigmatism of 0.5 D. produced. He thinks it is due either to accommodation or convergence or both. ALLING.

BRUNS (820, **Change in astigmatism produced by chalazion**) noted in his own case a change in the axis of astigmatism lasting over two months, due to a chalazion on the upper lid. ALLING.

CHIARI (821, **Contributo allo studio delle modificazioni delle curve corneali in rapporto alle contrazioni dei muscoli**) reports the results of a series of measurements made with the help of Javal's ophthalmometer on young people to ascertain the influence exerted by the contraction of the rectus externus and internus on the curvature of the cornea. His conclusions are that the contraction of the lateral recti affects the static condition of the astigmatic cornea and that in most cases this influence is felt simultaneously in the vertical and horizontal meridians. Almost always there is an increase of the curvature in the horizontal meridian and a decrease in the vertical. CIRINCIONE.

VII.—MUSCLES AND NERVES.

823. GUTMANN, G. **Two cases of congenital paresis of the inferior rectus, cured by operation.** *Berliner klinische Wochenschr.*, No. 33, 1905.

824. GIESLICH, NIC. **Infantile nuclear atrophy.** *Deutsche med. Wochenschr.*, 1905, No. 37, p. 1462.

825. MAUCH, J. **A case of true hypertrophy of the external eye muscles.** *Arch. f. Ophthalm.*, lii., 1, p. 126.

826. BERGER, C. **Isolated injuries of the external eye muscles.** *Klin. Monatsbl. f. Augenheilk.*, xliii., ii., p. 480.

827. HIRSCHBERG, J. **Result of a rare strabismus operation seen at the end of 32 years.** *Centrlbl. f. prakt. Augenheilk.*, xxxix., p. 335.

828. SIEMERLING. **Contribution to the pathological anatomy of early isolated paralysis of the eye muscles.** *Arch. f. Psychiatrie*, 40, p. 41.

829. HAMMER, D. **Paralyses of the eye muscles as the result of chronic lead and nicotine poisoning.** *Zeitsch. f. Nervenh.*, 29, p. 323.

830. LANDOLT, E. **Insufficiency of convergence.** *Archives d'ophtal.*, xxv., p. 393.

831. DE LAPERSONNE, F. **Ocular torticollis and strabismus sursumvergens.** *Ibid.*, xxv., p. 585.

832. COPPEZ, H. **Multiple and transitory paralyses of the ocular muscles.** *Policlinique de Bruxelles*, May 15, 1905.

833. GAUSSEL, A. **Paralysis of the associated lateral movements**

of the eyes in affections of the cerebellum, corpora quadrigemina, and pons. *Revue de médecine*, 1905. *Bulletin médical*, 1905, p. 991.

834. VALUDE. **Blepharospasm treated by deep injections of alcohol at the exit of the facial nerve.** *Annales d'oculiste*, cxxxiv., p. 436.

835. ROOSA, D. B. ST. JOHN. **Loss of vision from non-use.** *Medical Record*, Feb. 25, 1905.

836. VINSENHALLER, F. **Traumatic section of the external rectus, and probable laceration of the optic nerve.** *Ann. of Ophth.*, April, 1905.

837. REDDINGIUS, R. A. **Treatment of convergent strabismus.** *Ned. Tydschr. v. Geneesk.*, 1905, ii., No. 10.

838. FORSELLES. **The signification of paralysis of the abducens in otitis media.** *Finska Laekaresaellsk. Handl.*, 1905, p. 136.

GUTMANN'S (823, **Two cases of congenital paresis of the inferior rectus**) patients were two boys, 13 and 11 years old, who had had vertical strabismus from early childhood. The inferior rectus was found to be inserted not at 6.5*mm*, but in one case at 8 and in the other at 10*mm*. from the margin of the cornea. In both cases advancement of the inferior rectus produced the desired result.

GIESLICH'S (824, **Infantile nuclear atrophy**) 14-year-old patient had a congenital paralysis of both facial nerves, of the left hypoglossus, and of movements of the eye to the right and left, while the convergence was preserved. The site of the congenital multiple cranial nerve paralysis, first described by Mœbius, is discussed. The extinction of the electric excitability showed the affection to be "in the peripheric neuron." He considers that the cause of the clinical appearances is to be sought in a disease of the medulla and the caudal end of the pons.

MAUCH (825, **A case of true hypertrophy of the external eye muscles**) examined an eyeball enucleated on account of carcinoma of the upper jaw. Macroscopically the stumps of the muscles had 3½ times the diameter of those of normal eyes. Microscopic examination revealed a marked increase in the diameter of the individual fibres with no increase in their number. The explanation given of this hypertrophy due to activity was the difficulty experienced in moving the eye, which had gradually increased for four years in consequence of the very slowly growing tumor.

BERGER (826, **Isolated injuries of the external eye muscles**)

reports six cases of isolated injuries to the external eye muscles, one a complete separation of the inferior rectus, three of partial division of the internal or external rectus. These three healed perfectly spontaneously.

HIRSCHBERG (827, **Result of a rare strabismus operation seen at the end of 32 years**) reports the result at the end of 32 years of an operation for strabismus which he had performed on a woman 22 years old. The right eye squinted inward and downward, had defective movement outward, and the head was turned much toward the right. After tenotomy of the right internus the right externus was advanced after division of a dense connective tissue which bound its lower side to the eyeball. The operation resulted in a straight position of the eyes and a normal posture of the head, a result which is still maintained.

SIEMERLING'S (828, **Contribution to the pathological anatomy of early isolated paralysis of the eye muscles**) observation was made on a woman 55 years of age suffering from morphinism, who had had ophthalmoplegia totalis externa with complete ptosis since her third year. She had limited motion of the left eye corresponding to the distribution of the oculomotorius, particularly upward, less inward and downward, and a moderate degree of ptosis. The pupils, which were contracted as a result of the morphinism, reacted very little to light and convergence. The patient died of pneumonia and the autopsy revealed destruction of the trochlearis and oculomotorius nuclei. There were remains of a hemorrhage in the form of a cyst with traces of blood pigment. On the right side the nucleus of the trochlearis was totally destroyed, on the left side a very small portion remained. On the right side there was only a small trace of the nucleus of the oculomotorius in the proximal portion, on the left side the distal and proximal ends were preserved. The roots of the oculomotorius were greatly degenerated on the right side, somewhat better preserved on the left. There was a great deficiency of fibres in the posterior or longitudinal bundles of both sides, but especially the right. The eye muscles themselves were fatty and atrophic. These changes seemed to have been caused by a hemorrhage which occurred in early childhood and was confined to the central gray matter in the region of the nuclei

mentioned. The cause of the hemorrhage could not be determined.

HAMMER'S (829, **Paralyses of the eye muscles as the result of chronic lead and nicotine poisoning**) patients were: (1) A girl sixteen years old working in a porcelain manufactory, who had in addition to the general symptoms of lead poisoning neuro-retinitis and paralysis of the abducens of both eyes. Potassic iodide and baths cured the diplopia. The vision was reduced to 5/20. (2) A woman fifty-nine years old, formerly syphilitic and a great smoker, had retrobulbar neuritis, paresis of both motor oculi, and paralysis of the left abducens. The patient was forbidden to smoke, yet the ocular symptoms did not improve.

LANDOLT (830, **Insufficiency of convergence**) reports a case of insufficiency of convergence in a 13-year-old child which another physician believed he could cure by means of a tenotomy of the external rectus of the right eye. Convergent strabismus with homonymous diplopia resulted. A cure was finally obtained by means of an advancement of the left internal rectus. BERGER.

DE LAPERSONNE (831, **Ocular torticollis and strabismus sursumvergens**) reports two cases of torticollis with strabismus at the same time. No diplopia could be demonstrated. Hence it could not be asserted that the torticollis was due to an attempt to secure single vision under the pressure of diplopia. The writer thinks that in both cases there was originally a disturbance of the co-ordinate movements of the eyes which manifested itself as a strabismus and at first induced diplopia which in turn occasioned the oblique position of the head. The latter persisted after the diplopia had disappeared. Treatment consisted in the advancement of the insufficient muscles. In one of the cases in which another ophthalmologist had produced strabismus sursumvergens by a tenotomy of the superior rectus, advancement of the inferior rectus was necessary before a cure could be effected.

BERGER.

COPPEZ (832, **Multiple and transitory paralyses of the ocular muscles**) observed the appearance of multiple transitory paralyses of the eye muscles as the initial symptom of tabes dorsalis in a woman 32 years of age. First there was paralysis

of the ciliary muscle of the left eye, then a paralysis of the same muscle on the right side, with coincident spasm of the accommodation and paralysis of the inferior rectus of the left eye. Five days later there was a secondary contracture of the left levator palpebræ, probably caused by paralysis of the orbicularis. After another five days there was a paralysis of the right external rectus, and three days later a paralysis of the right inferior rectus with spasm of the accommodation on the same side. After three weeks only a paralysis of the right inferior rectus could be found, but Westphal's and Romberg's symptoms were present and the case was recognized as one of incipient tabes. BERGER.

GAUSSEL (833, **Paralysis of the associated lateral movements of the eyes in affections of the cerebellum, corpora quadrigemina, and pons**) comes to the following conclusions: (1) The persistent conjugate deviation of the eyes and the paralysis of the lateral movements of the eyes without change of their direction do not occur in diseases of the cerebellum. (2) The latter paralysis, with or without deviation, excludes the presence of disease of the corpora quadrigemina. The latter is not a centre for the associated lateral movements of the eyes. (3) The paralysis of the associated lateral movements of the eyes with preservation of the convergence and the movements of the eyes upward and downward is characteristic of a lesion in the upper part of the pons. BERGER.

VALUDE (834, **Blepharospasm treated by deep injections of alcohol at the exit of the facial nerve**) reports two cases of blepharospasm in which perfect recovery was obtained by means of an injection of alcohol containing 1% of cocaine at the exit of the facial nerve from its bony canal according to Schloesser's method. In one of the cases the injection was followed by a swelling in the parotid region, but after a few days this passed away. BERGER.

ROOSA (835, **Loss of vision from non-use**) reports the case of a man 46 years old who when a child had convergent strabismus of the right eye. Divergence followed an operation and this was later corrected by another operation. Some years later his left eye, the better one, was injured and his vision fell to 20/200. After he had constantly worn the correction

for a high degree of astigmatism over his right eye for a year and a half the patient was able to read Jaeger No. 1. At the end of a few months more his vision had risen to 20/30.

ALLING.

The injury reported by VINSENHALLER (836) was a total detachment of the external rectus by the point of an umbrella which penetrated into the orbit. The injury resulted in optic atrophy.

ALLING.

REDDINGIUS (837, **Treatment of convergent strabismus**) reviews the work of Claud Worth, *Squint, its Causes, Pathology, and Treatment*, and claims that a large part of the theories there promulgated had been previously advanced by himself. He explains Worth's failure to obtain satisfactory results from operations in alternating convergent strabismus by the statement that then the exercises of each are undertaken singly and are begun with the exercises in simultaneous vision and in fusion, while exercises in the vision of corresponding portions of the visual fields should precede.

JITTA.

FORSELLES' (838, **The signification of paralysis of the abducens in otitis media**) case was one of a boy who had an acute otitis media with a free flow of pus. On the 5th day there was pain in the left side of the head with swelling over the left mastoid and on the 13th day paralysis of the left abducens appeared. On the 20th day the mastoid was opened and pus found in the cells. The next day the skull was trephined, but no new collection of pus found. Two months and a half later the patient was well and had no diplopia. From this case together with a consideration of twenty taken from literature Forselles concludes that the paralysis of the abducens is due to a slight meningitis caused by infection. As regards treatment he thinks that the mastoid cells should be opened, and if this does not relieve the pain in the head the cranial cavity should be opened in the middle fossa.

HELLGREN.

Sections VIII.–XII. Reviewed by DR. R. SCHWEIGGER, Berlin.

VIII.—LIDS.

839. FOX, L. WEBSTER. **Ablepharia partialis of the upper eyelid.** *Annals of Ophthalmology*, July, 1905.

840. RAEHLMANN, E. **Amyloid degeneration of the lids and conjunctiva.** *Klin. Monatsbl. f. Augenheilk.*, xliii., ii., p. 435.

841. MANZUTTO, G. **Un caso di sclerosi iniziale doppia delle palpebre.** *Annali di ottalmologia*, 1905, pp. 37–42.

842. HOTZ, F. C. **The technique of implanting Thiersch epidermis grafts in the operation of symblepharon.** *Annals of Ophthalm.*, July, 1905.

843. BRUNS, H. D. **Ptosis and the operation of Motais.** *Annals of Ophthalmology*, July, 1905.

844. WERNER, LOUIS. **Unilateral ptosis and œdema of the lids (?). Thrombosis of the cavernous sinus occurring in the course of scarlatina.** *Ophthalmoscope*, May, 1905.

845. CHRONIS, P. D. **A radical operation for the cure of trichiasis and entropion of both lids.** *Klin. Monatsbl. f. Augenh.*, xliii., ii., p. 6.

846. MORETTI, E. **L'iniezione di paraffina fusa nella cura dell' entropion.** *Annali di ottalmologia*, 1905, pp. 391–395.

847. BIRCH-HIRSCHFELD. **Further experience in the use of the cartilage of the ear for the restoration of defects of the lids.** *Muenchener medicinische Wochenschrift*, 1905, No. 43, p. 2075.

848. CALDERARO. **Sui migliori processi di blefaroplastica.** *La clinica oculistica*, April–July, 1905.

849. RUECKEL, W. **Lymphoma or lymphadenoma of the lids and orbit.** *Inaug.-Diss.*, Giessen, 1905.

850. ISCHREYT. **Two cases of xeroderma pigmentosum with formation of tumors in the lids.** *Zeitschr. f. Augenheilk.*, xiv., 1, p. 31.

851. VALUDE. **Epithelioma at the internal canthus.** *Soc. d'ophtalmol. de Paris*, June 6, 1905.

852. DARIER. **Treatment of epithelioma by radium.** *Soc. d'ophtalmol. de Paris*, July 4, 1905.

853. VALUDE. **Radiotherapy of epithelioma.** *Annales d'oculistique*, cxxxiv., p. 81.

FOX (839, **Ablepharia partialis of the upper eyelid**) describes a case in which there was entire absence of both eyebrows—the skin passing from the forehead over the supraorbital ridges. In place of the normal eyelids the skin was prolonged into two pointed flaps the apices of which were adherent to the cornea. In one lid a vestige of cartilage could be felt. The eyeballs were in a condition of xerosis from lack of moisture. There was only perception of light. ALLING.

Amyloid is found in the eye according to RAEHLMANN (840, **Amyloid degeneration of the lids and conjunctiva**) as a purely local state without disturbance of the general condition and is capable of being retransformed chemically into normal albumin. The amyloid degeneration may start in the con-

nective tissue, muscles, vessels, skin, and glands, and may be confined to any one of these tissues. Frequently it is preceded by a hyaline degeneration. Colloid and mucous transformations were also present.

MANZUTTO'S (841, **Un caso di sclerosi iniziale doppia delle palpebre**) case is the ninth of double chancre of the lids now published. CIRINCIONE.

To facilitate the perfect apposition of Thiersch grafts to both bulbar and lid surfaces, after dissecting off the symblepharon, HOTZ (842, **The technique of implanting Thiersch epidermis grafts in the operation of symblepharon**) uses a lead or tin plate and fastens it, in the case of the lower lid, by sutures passing through the upper edge of the plate and the lid border. This arrangement allows opening of the eye and inspection of the bulbar portion of the flap. In cases where the upper lid is involved he finds it necessary to use a plate covering the whole eyeball reaching from the upper to the lower fornix. A hole may be cut to leave the cornea free. The lids are sewed together. ALLING.

BRUNS (843, **Ptosis and the operation of Motais**) finds the operation of Motais for ptosis (suture of the tendon of the superior rectus to the upper lid between the skin and tarsus) very effective and describes five successful cases. The upper lid follows the movement of the eye far better than with other operations hitherto employed. ALLING.

WERNER'S (844, **Thrombosis of the cavernous sinus during scarlatina**) patient, a boy six years old, had a mild attack of scarlet fever. Its course was favorable until the ninth day, when the temperature rose and the patient became stupid. The right eye protruded, its lids red and swollen. The temperature fell after a few days, but the exophthalmos persisted for some time and then disappeared. There was no change in the fundus, no ear trouble, and no albuminuria. The author is of the opinion that very probably a thrombosis of the cavernous sinus was the cause of these symptoms, rather than a metastatic cellulitis independent of the thrombosis. The interesting points about this case are the absence of otitis media, the complete restoration without suppuration, and the long persistence of the exophthalmos after the subsidence of the acute symptoms. DEVEREUX MARSHALL.

CHRONIS (845, **A radical operation for the cure of trichiasis and entropion of both lids**) begins his operation with division of the outer canthus, enters the lid *2mm* from its margin, splits it, separates the muscles from the tarsus, thins the latter, completes the canthoplasty with three sutures, and finally makes an intermarginal incision *1mm* deep behind the lashes.

MORETTI (846, **L'iniezione di paraffina fusa nella cura dell' entropion**) does not accept the conclusions of Bolognesi in regard to the injection of paraffin in operations for entropion.

CIRINCIONE.

BIRCH-HIRSCHFELD (847, **Further experience in the use of the cartilage of the ear for the restoration of defects of the lids**) says that Elter and Haas are in error in claiming priority in the repair of lids with the cartilage of the ear and that Buedinger is entitled to this honor. In another article in the same journal Elter and Haas acknowledge Buedinger's priority.

After a brief historical review of blepharoplasty CALDERARO (848, **Sui migliori processi di blefaroplastica**) divides these operations into four groups: (1) Indian method with twisted flaps; (2) French method with sliding flaps; (3) pedicled flaps; and (4) the palpebro-palpebral method. He considers each of these methods in a separate chapter and presents the advantages and deficiencies of each operation on the basis of his clinical and anatomical investigations. His conclusions are: (1) The best blepharoplastic operation is Fricke's, a pedicled flap taken from the neighboring region and turned so as to cover the loss of substance. (2) In order to overcome the elastic and cicatricial contraction the flaps should be cut twice as large as the surface to be covered. (3) The nutrition which the flap receives through the pedicle is necessary for its life during the first 36 hours, after that it draws its nourishment from the subjacent surface and the pedicle may be excised or otherwise disposed of, yet it is to be recommended as a good precaution to leave it alone for a couple of weeks. (4) The bodies of the flaps should contain only the cutis but the pedicle must also contain the subcutaneous tissue. It is not necessary to reject cutis with cicatricial places, provided that the scars are not adherent to bone. (5) Twisted

flaps attach themselves well to a surface in from 24 to 48 hours, even when the surface is of bone denuded of periosteum, or includes a small cavity. (6) To cover the places left bare by the removal of the flaps the edges of the adjoining cutis are drawn together, and when this is not possible the surface is left to granulate. The anæsthetic effect is better than that obtained by the use of pedicle. (7) When it is impossible to obtain suitable flaps from the face Tagliacozzi's operation may be performed. (8) The result obtained by twisted flaps is definitive and permanent, at least after a year. (9) The use of sliding flaps in blepharoplasty must be given up as insufficient and injurious. The same is to be said of de Wecker's mosaic grafts of the dermo-epidermis. (10) Wolfe's broad skin graft is indicated as a covering for the upper lid only when the margin and framework of the lid are well preserved. In such cases the delicate skin of the prepuce or of the labia majora should be used. Wolfe's grafts should be used to replace loss of skin of the lower lid, or in the region of the canthus, only in case of necessity when the use of twisted flaps is impossible. (11) Thiersch grafts are excluded from ophthalmic surgery. (12) For the reconstruction of a lid *in toto* the only operation productive of excellent final results is the palpebro-conjunctival of Prof. Cirincione, by means of which a half lid may be restored *in toto* at the expense of the conjunctiva of the remaining lid. For the inner half of the lid the sliding operation of de Vincentiis may be used. CIRINCIONE.

The lymphadenoma described by RÜCKEL (849, **Lymphoma or lymphadenoma of the lids and orbit**) had existed in a young girl for about a year, had produced a tumor as large as a bean in the lower lid, and another as large as a pea in the upper lid. It presented a bluish appearance through the skin, was soft and easily pressed back into the orbit. The eyeball was pressed somewhat outward and forward. At the operation the tumors were found attached together and to the bones in the orbit. They contained spaces filled with fluid which was partly thin and yellow, partly thick and bloody. The compact mass was lymphadenoma, the cysts were dilated lymph vessels. There were no glandular swellings. There was no recurrence. The lymphoma of the lids and orbit is a rare and interesting form of tumor because neither lymph

vessels nor lymph follicles occur in the orbit itself. Only in the neighborhood of the lachrymal gland are there lymphatic connective tissue and follicles. In the neighborhood of the lachrymal sac also some of the described lymph tumors have originated. Simple lymphomata should be extirpated at as early a date as possible, but the leucæmic variety should be avoided on account of the danger of hemorrhage, and subjected to the influence of X-rays and radium. In pseudoleucæmia the tumors should be removed as early as possible and the patients treated with arsenic and potassic iodide.

ISCHREYT'S (850, **Two cases of xeroderma pigmentosum with formation of tumors in the lids**) first patient, a boy ten years old, had passed the stages of erythema and of teleangiectasis and pigmentation of xeroderma pigmentosum and had already entered upon the third stage, that of tumor formation. The tumors were angiomata, warts, and carcinomata. The lids were affected with œdema, teleangiectasis and loss of lashes, ectropion and carcinoma. The conjunctiva was swollen, the tarsus undergoing cystic degeneration. Both corneæ had white opacities and a pannus-like new formation of vessels. The second case was seen in an earlier stage. His parents were related.

VALUDE (851, **Epithelioma at the internal canthus**) exhibited a wax impression of a case of epithelioma of the inner margin of the lid which was cured by radium. BERGER.

DARIER (852, **Treatment of epithelioma by radium**) exhibited a patient in whom an epithelioma of the inner margin of the lid had resisted cauterization and extirpation and was cured by radium. Particular attention was called to the soft yielding scar which resulted from the latter treatment. Darier showed some radium pastilles by means of which the individual reaction of patients to the radium treatment can be quickly determined. BERGER.

VALUDE (853, **Radiotherapy of epithelioma**) reports four cases of cancerous tumors of the lids and conjunctiva which had been treated by means of the X-rays and radium. The first was a recurrent epithelioma of the cheek with extension to the lower lid. Radium applied. No result. The second was a recurrent palpebro-conjunctival epithelioma. Radium applied. Improvement. The third was a cancer of the skin

of the inner margin of the lid. Radium applied. Recovery. The fourth was a papilloma of the upper lid. Recovery under radium. In the second case the X-rays were also applied and seemed to contribute more to the improvement than the radium. Valude is of the opinion that the use of radium or the X-rays is indicated only in the benign forms of cancer or papilloma, while in the malignant forms extirpation should be practised as early as possible. BERGER.

IX.—LACHRYMAL APPARATUS.

854. MORELLI, E. **Sopra un caso di dacrioadenite orbitaria suppurata consecutiva ad erysipela facciale.** *Annali di ottalmologia*, 1905, pp. 3–32.

855. ORLANDINI, O. **Studi sulle dacrioadeniti.** *Annali di ottalmologia*, 1905, p. 304.

856. CAPOLONGO, C. **Osservazione clinica ed anatomica su di un caso di dacriops.** *Archivio di ottalm.*, xii., 9–10

857. GOLDZIEHER, M. **Cyst of the lachrymal gland. Dacryops.** *Arch. f. Ophthalmologie*, lxi., 2, p. 339.

858. VAN DUYSE. **Contribution to the study of symmetric, pseudoleucæmic lymphomata of the lachrymal and salivary glands.** *Archives d'Ophtalm.*, xxv., p. 705.

859. PLITT, W. **Tuberculosis of the lachrymal gland.** *Klin. Monatsbl. f. Augenheilk.*, xliii., Beilageheft, p. 40.

860. DEMARIA, E. B. **Cylindroma of the lachrymal gland.** *Klin. Monatsbl. f. Augenheilk.*, xliii., 2, p. 513.

861. CORNER, ALBERT. **Inflammation of the lachrymal passages.** *British Medical Journal*, April 30, 1904.

862. SHIBA, S. **The etiology of inflammation of the lachrymal sac with tuberculosis of the neighborhood. Tuberculous dacryocystitis.** *Klin. Monatsbl. f. Augenheilk.*, xliii., Beilageheft, p. 63.

MORELLI (854, **Sopra un caso di dacrioadenite orbitaria suppurata consecutiva ad erysipela facciale**) reports the clinical history and objective examination of a case of acute, monolateral dacryoadenitis which followed an attack of facial erysipelas. Streptococci were found in the pus. After the glandular abscess had been opened the symptoms which depended on its pressure on the eyeball and the involvement of the cellular system of the orbit, exophthalmus, displacement of the globe, diplopia, disappeared. The author discusses these symptoms, particularly the exophthalmos, which he ascribes to the involvement of the retrobulbar connective tissue in the inflammatory process. CIRINCIONE.

Orlandini (855, **Studi sulle dacrioadeniti**) describes a considerable number of cases of dacryoadenitis which he has had opportunity to study. From his observations it appears that the palpebral portion of the gland is the more easily affected. The author is of the opinion that in many cases the cause of the trouble is infection carried by the blood-vessels from the conjunctiva or some distant organ. In a woman who died of pleuropneumonia the inflamed lachrymal gland contained diplococci which presented the morphological characteristics of Fränkel's. Another method of extension of the inflammatory process when seated in the conjunctiva is along the excretory canaliculi of the gland. In two cases of trachoma it was observed that the disease had involved the excretory ducts and in another case had extended to the parenchyma of the palpebral portion. The bacteriological examination proved negative in the non-suppurative forms and usually in the suppurative, but in some of the latter the staphylococcus pyogenes was found. This seems to indicate that the secretion of the lachrymal gland is particularly unfavorable to the life of micro-organisms.

Cirincione.

Capolongo's (856, **Osservazione clinica ed anatomica su di un caso di dacriops**) microscopical examination showed that the lesion was due to a cystic dilatation of an efferent duct of the gland. The acini were evidently in a state of secretory activity. As to the pathogenesis the author concludes that probably the excretory duct became closed in consequence of an inflammation which extended hither from the conjunctiva.

Cirincione.

Goldzieher (857, **Dacryops**) examined microscopically a dacryops which measured *23mm* long, *17mm* in the sagittal and *11mm* in its frontal diameter. Adherent glandular tissue containing mucus, as well as the multi-lobularity of the cyst, indicated that it was not a true retention cyst, but was rather a so-called mucous cyst and that it was caused by a disease of the gland.

On the basis of a very carefully studied case and the literature of all analogous cases, van Duyse (858, **Contribution to the study of symmetric, pseudoleucæmic lymphomata of the lachrymal and salivary glands**) comes to the conclusion

that Mikulicz's disease, symmetric tumors of the lachrymal and salivary glands from ectogenous infection, is not to be looked upon as a single disease. In his case there was a pseudo-leucæmic symmetric disease of the lachrymal and salivary glands, a hypertrophy of the peripheral lymphatic glands, a broad dark zone in the mediastinum shown by means of the Roentgen rays, and a swelling of the spleen. The diminution of the lymphoma of the lachrymal gland was obtained by the X-rays. The favorable influence exerted by the X-rays on leucæmic or pseudo-leucæmic tumors is confirmed. On the basis of the microscopic examination of the blood in his case van Duyse claims that the difference between leucæmia and pseudo-leucæmia is difficult to maintain.

BERGER.

According to PLITT (859, **Tuberculosis of the lachrymal gland**) a bilateral swelling of the lachrymal glands developed gradually during five years in a scrofulous girl and finally the glands became spontaneously luxated. Extirpation revealed the tuberculous character of the tumors. The glands showed no signs of inflammation. The upper retrotarsal conjunctival fold on one side showed tuberculous changes, while on the other the lachrymal sac was diseased. Some time later tuberculosis appeared in the axillary glands, the first manifestation of general tuberculosis.

The cylindroma of the orbital part of the lachrymal gland described by DEMARIA (860, **Cylindroma of the lachrymal gland**) occurred in a woman 33 years old without known cause. Within a few months a hard, movable tumor behind the ptosic upper lid developed with exophthalmos and bad vision. It pressed upon the optic nerve as the globe, aside from the lack of tears, was normal. Ten months after the extirpation there was a local recurrence with the same clinical picture. The orbit was exenterated, but the tumor recurred and the patient died.

CORNER (861, **Inflammation of the lachrymal passages**) recommends the application of tincture of iodine to the turbinated bones. He does not advise opening of the naso-lachrymal canal. DEVEREUX MARSHALL.

SHIBA (862, **The etiology of inflammation of the lachrymal sac with tuberculosis of the neighborhood. Tuberculous**

dacryocystitis) reports twelve cases of extirpation of the lachrymal sac in which the sac was plainly tuberculous. Some presented the clinical picture of the ordinary purulent dacryocystitis, some that of phlegmon. It thus appears to be more frequent than has been supposed and this is another reason why chronically purulent sacs should be extirpated. When healing is interfered with it is to be assumed that the bacilli have entered the surrounding tissue. Primary tuberculosis of the lachrymal sac is not so rare; all stubborn cases are suspicious. Tuberculosis of the sac and of the conjunctiva arises much more frequently from the nose than from the conjunctiva.

X.—ORBIT AND NEIGHBORING CAVITIES.

863. DE LAPERSONNE. **Phlegmon of the orbit and optic atrophy.** *L'ophtalmologie provinciale*, Feb., 1905.

864. KAISER, FR. **A case of orbital phlegmon with formation of abscesses in the regions of the nose, cheek, and temple, and with involvement of the nasal cavity and pharynx.** *Arch. f. Ophthalm.*, lxi., 3, p. 457.

865. MEDING, C. G. **Two cases of subperiosteal hemorrhage of the orbit from scurvy.** These ARCHIVES, xxxiv., p. 611.

866. BLACK, N. M. **Difficulties in the diagnosis of aseptic foreign bodies in the orbit.** *Ophth. Record*, April, 1905.

867. LEDBETTER, S. L. **Breech-pin three years in the orbit.** *Ophth. Record*, March, 1905.

868. POSEY, W. C. **Shot wound of the orbit. Post-traumatic delirium. Extraction of bullet with preservation of the eyeball.** *Ophth. Record*, March, 1905.

869. CZERMAK, W. **Osteoplastic resection of the outer wall of the orbit.** *Deutsche med. Wochenschr.*, 1905, No. 39-40.

870. CAUSE, FR. **The pathogenesis of traumatic diseases of the orbit. Emphysema of the orbit. Retrobulbar hemorrhage. Traumatic enophthalmos.** *Arch. f. Augenheilkunde*, lii., 3, p. 313.

871. PIHL, A. **A tumor-like formation in an empty orbit. Pathological examination.** *Archiv f. Ophthalmologie*, lxi., 1, p. 223.

872. BINDI, F. **Endotelioma periostale melanotico dell' orbita. Emoangio endotelioma. Contributo clinico-ematologico ed istologico.** *Annali di ottalmologia*, 1905, pp. 541–569.

873. BARDELLI, L. **Echinococcus of the orbit.** *Ibid.*, pp. 465–480.

874. TREU, E. **A case of echinococcus of the orbit.** *Arch. f. Augenh.*, liv., 2, p. 171.

875. LUKIS, J. M. **Orbital sarcoma. Kroenlein's operation.** *Ophthal. Review*, August, 1905.

876. RING, G. O. **Sarcoma of the orbit. Report of a case.** *New York Medical Journal*, June 19, 1905.

877. HANSELL, H. F. **A case of cystic sarcoma of the orbit. Extirpation. Death.** *Ophthalmic Record*, July, 1905.

878. MELLER, J. **Lymphatic tumors of the orbit and the eye.** *Archiv f. Ophthalmologie*, lxii., 1, p. 130.

879. HAGEN-THORN, J. E. **Intermittent exophthalmos with varix racemosus capitis communicans. Operation. Recovery.** *Russk. Vratsch*, 1905, No. 30.

880. POSEY, W. C. **Intermittent exophthalmos, with report of a case.** *Jour. Amer. Med. Association*, Feb. 18, 1905.

881. HANSELL, H. F. **Pulsating exophthalmos. Successive ligations of the common carotid artery of each side. Death.** *Ibid.*

882. SATTLER, H. **A new operation for the treatment of pulsating exophthalmos.** *Klin. Monatsbl. f. Augenheilk.*, xliii., 2, p. 1.

883. SCHWALBACH, G. **Treatment of pulsating exophthalmos.** *Ibid.*, 475.

884. LEWIN, H. **A case of spontaneous luxation of the globe.** *Berl. klin. Wochenschr.*, 1905, No. 35, p. 1105.

885. BOSSALINO, D. **Contributo allo studio dell' anatomia patologica delle pareti orbitali. Cisti ematica del seno frontale.** *Annali di ottalmologia*, 1905, pp. 408–420.

886. FISH, H. M. **The connection between diseases of the accessory nasal sinuses and internal diseases of the eye.** *Arch. f. Aug.*, lii., 3, p. 275.

DE LAPERSONNE (863, **Phlegmon of the orbit and optic atrophy**) observed a case in which a furuncle of the brow was the starting-point of an orbital phlegmon which resulted in suppurative dacryoadenitis, a periostitis of the margin of the orbit with separation of a sequestrum due to secondary infectious staphylococcus osteomyelitis, and an optic atrophy on the same side. The last must have been due to the action of toxines. BERGER.

KAISER (864, **A case of orbital phlegmon with formation of abscesses in the regions of the nose, cheek, and temple, and with involvement of the nasal cavity and pharynx**) describes a case with extensive inflammation and abscess formation particularly along the veins which were connected with the orbit. Probably there was a thrombophlebitis which extended to the pterygoid plexus and through the angular vein to the external nasal vein and involved the veins of the nose and pharynx.

MEDING (865, **Two cases of subperiosteal hemorrhage of the**

orbit from scurvy) reports two very similar cases of subperiosteal hemorrhage in the orbit, clinically characterized by swellings above the lachrymal glands, together with petechiæ on the temple and abdomen, and exophthalmos. Proper diet brought about recovery in both cases in a few weeks. TREUTLER.

BLACK (866, **Difficulties in the diagnosis of aseptic foreign bodies in the orbit**) describes a case in which a number of splinters of wood were found in the upper part of the orbit. The presence of these foreign bodies was made probable only by the persistence of exophthalmos after the traumatism. This occurrence shows that fairly large foreign bodies may enter the orbit without injury to the eyeball or its adnexæ and without leaving any marked trace. It may happen that the patient knows nothing of any foreign body and the physician may be first consulted on account of loss of vision. Then it may be found in a given case that there is at most a slight irritation of the eye with more or less marked exophthalmos and limitation of motion. ALLING (F.).

The piece of metal removed by LEDBETTER (867, **Breech-pin three years in the orbit**) was about 30*mm* long by 20*mm* broad. It had destroyed the eye and lay firmly encapsuled in the bony wall of the orbit. ALLING (F.).

CZERMAK (869, **Osteoplastic resection of the outer wall of the orbit**) secures by his modification of Kroenlein's operation a greater convenience of approach and better protection to the soft tissues in the orbit, which is desirable when a small tumor is situated behind the apex of the orbital pyramid, or when a tumor lies beneath the eyeball and reaches far forward, or finally when it is situated on the nasal side of the eyeball.

The emphysema of the orbit reported by CAUSE (870, **The pathogenesis of traumatic diseases of the orbit. Emphysema of the orbit. Retrobulbar hemorrhage. Traumatic enophthalmos**) was relieved by means of a syringe with a long needle so that the eye sank back at once to its normal position. The origin of an emphysema of the lid from one of the orbit is through three weak places in the septum orbitale, situated one at the anastomosis of the orbital and facial vessels, the other two at the upper margin of the orbit. Through these a true orbital emphysema may become an

orbito-palpebral. A retrobulbar hemorrhage which had caused great exophthalmos was also aspirated while fresh with a large syringe and the eyeball thus returned to its normal position. The exophthalmos described by Cause appeared within a week after a kick which fractured the lower wall of the orbit. In order that the eyeball should have sunken there must have been a dilaceration of the supporting fascia which joins the muscles both with Tenon's capsule and also by means of the third portion with the wall of the orbit and is not identical with the septum orbitale. At the same time space is often left behind the globe by a cicatrizing hemorrhage for the retraction of the eyeball.

The tumor-like formation described by PIHL (871, **A tumor-like formation in an empty orbit. Pathological examination**) was granulation tissue which formed about a foreign body which had entered the orbit at the time of injury. It contained cholesterin crystals and ferruginous pigment. Numerous giant cells and epithelial cells gave the picture of the so-called foreign-body tuberculosis.

BINDI (872, **Endotelioma periostale melanotico dell' orbita. Emoangio endotelioma. Contributo clinico-ematologico ed istologico**) gives the clinical history of a case in which a tumor appeared in the left orbit without any previous trauma, dislocated the eyeball downward, and greatly reduced the vision. The tumor was extirpated together with the eyeball and the external apophysis of the orbit. The histological examination showed it to be composed of roundish, frequently multinuclear connective-tissue elements arranged in imperfect cavities containing red corpuscles and with a thin connective-tissue wall. It contained numerous vascular cavities with frequent extravasations near which melanotic pigment could be found. The author considers that the neoplasm was of periosteal origin and that it was an endothelioma.

CIRINCIONE.

BARDELLI (873, **Echinococcus of the orbit**) insists on the importance which modern hæmatological researches attribute to the examination of the blood as a fundamental condition for the diagnosis of echinococcus cysts. These researches have shown that this disease is very frequently

accompanied by eosinophilia. This condition was found in his case. CIRINCIONE.

A monolateral exophthalmos, which had existed nine years, had increased intermittently after three births and after a harsh examination. TREU (874, **A case of echinococcus of the orbit**), who performed Kroenlein's operation on the case four months later, found the orbit filled by an echinococcus cyst, and believes that the examination of the eyeball luxated the globe forward and that it was secured in this place by the rapid growth of the cyst.

LUKIS'S (875, **Orbital sarcoma. Kroenlein's operation**) patient was a man forty-five years old who had a large swelling beneath the left upper lid, which had forced the eyeball downward, outward, and forward. A tumor could be felt between the roof of the orbit and the eye. The pupil could scarcely be seen. The eye had lost all perception of light. Kroenlein's operation was performed without opening the conjunctiva. The tumor was exposed and shelled out with the finger. The bone and soft parts were replaced and sutured. Healing was prompt and the eyeball returned into the orbit. The tumor was a small spindle-celled sarcoma measuring 2½ by 1½ inches. A month after the operation the fundus was normal and the vision ⅚.

DEVEREUX MARSHALL.

RING (876, **Sarcoma of the orbit. Report of a case**) advises an exploratory incision in cases of tumors of the orbit and believes that the virulence and the danger of metastasis can be lessened by treatment with the X-rays. The result of sterilization of malignant neoplasms in other parts of the body by cataphoresis indicates the application of this method to tumors of the orbit also. ALLING (F.).

The tumor excised by HANSELL (877, **A case of cystic sarcoma of the orbit. Extirpation. Death**) was about the size of a man's fist and weighed 315 grams. It was largely cystic.

ALLING.

MELLER (878, **Lymphatic tumors of the orbit and the eye**) observed lymphatic tumors not only in the orbit, but also in the conjunctiva and cornea and intraocularly in the choroid. They were usually flat, scale-like thickenings, but appeared also as compact tumors. Operation is dangerous

on account of hemorrhage. The basis is almost always lymphatic leucæmia.

Non-pulsating exophthalmos with obscuration of vision occurred in a patient of HAGEN-THORN'S (879, **Intermittent exophthalmos with varix racemosus capitis communicans. Operation. Recovery**) who was suffering from an extensive varix racemosus whenever she bent her head forward. When the head was bent backward the exophthalmos disappeared and the vision returned. Ophthalmoscopically everything was normal except for a rather marked tortuosity of the retinal veins. After the varix had been cured by operation the exophthalmos returned no more. The author ascribes the cause of the exophthalmos to a congenital abnormal dilatation of the orbital veins.

HIRSCHMANN.

POSEY (880, **Intermittent exophthalmos, with report of a case**) has collated 40 cases of intermittent exophthalmos which showed itself under particularly favoring circumstances, such as stooping. The clinical history as well as the absence of pulsation and bruit distinguished them from exophthalmos due to the presence of vascular tumors. The probable cause is the formation of varices in the orbit.

ALLING (F.).

In HANSELL'S (881, **Pulsating exophthalmos. Successive ligations of the commn carotid artery of each side. Death**) case the exophthalmos and the bruit disappeared immediately after the ligation. Six weeks later increasing retinal hemorrhages and recurrence of the exophthalmos necessitated ligation on the other side. The patient died five days later in convulsions. ALLING (F.).

SATTLER (882, **A new operation for the treatment of pulsating exophthalmos**) obtained a good result in a case of pulsating exophthalmos due to retrobulbar aneurismal varix by the ligation and resection of the dilated superior ophthalmic vein alone. To do this Kroenlein's operation is not necessary. Perfect healing is obtained through thrombosis in the cavernous sinus which causes great pain in the back part of the head for at least two weeks, but is attended with no real danger.

SCHWALBACH (883, **Treatment of pulsating exophthalmos**)

published a year before Sattler a case of ligation of the orbital vein in a traumatic arterio-venous aneurism of the internal carotid and the cavernous sinus, after the common carotid of the same side had been ligated without result. The boy recovered after five days. The operation should always be performed first on the varix.

Lewin's (884, **A case of spontaneous luxation of the globe**) patient, a corpulent man fifty-three years old, had a bilateral, uncomplicated exophthalmos which was somewhat increased by excitement. Suddenly, during sleep, the left eye protruded beyond the lids, causing pain. The patient was able to replace it himself. But the accident repeated itself frequently and occurred occasionally to the right eye also when he stooped or had his lids everted, so that the luxation became to a certain degree habitual. The eyes suffered no permanent injury. During luxation the ophthalmoscopic picture was that of compression of the optic nerve, or of the central vessels; externally there was stasis of the blood. Recovery followed quickly.

Bossalino's (885, **Contributo allo studio dell' anatomia patologica delle pareti orbitali. Cisti ematica del seno frontale.**) patient suffered a severe traumatism of the eye in Nov., 1898, with the following immediate consequences: rupture of the cornea, prolapse of the iris, ecchymosis and considerable intumescence of the orbital region, and a slight degree of exophthalmos. In May, 1901, there was a swelling at the site of the right frontal prominence, very marked exophthalmos, the eyeball dislocated downward and forced outward. The movements of the eye were preserved and with slight pressure the eyeball could be pressed back into the orbit. Operation revealed an intumescence which raised the periosteum together with a thin plate of bone and involved the entire upper wall of the orbit and a part of the outer. Between two layers of bone was a cavity which contained a brownish cyst of less than fibrous consistence and as large as a small nut, which was easily removed. The histological examination showed that the cyst wall was formed of a connective tissue which exhibited various peculiarities in its outermost and innermost layers. In the midst of the connective tissue which formed the wall of the cyst there were numerous crystals of hæma-

toidin and collections of yellowish-brown pigment. There was no trace of an epithelial covering to the outer surface of the cyst wall. The author is of the opinion that this was a true hemorrhagic cyst which developed in the frontal sinus as the result of the traumatism. CIRINCIONE.

FISH'S (886, **The connection between diseases of the accessory nasal sinuses and internal diseases of the eye**) seven cases seem to him to demonstrate the causal relation between diseases of the accessory sinuses and uveitis, *i.e.*, swelling of the ciliary body, shown by recession of the near point, and of the iris with synechiæ, deposits and opacities of the vitreous, and also injection of the conjunctiva, œdema of the lids, slight œdema of the fundus, and hyperæmia of the papilla. The disease of the accessory sinus could always be detected only by a very careful special examination, and does not consist of open empyema with free outflow, but of a simple mechanical stenosis or closure of the naso-frontal canal by congestion or inflammation, so that Fish accepts Zieben's theory of passive venous stasis in the orbit. Even though no pathological secretion was previously visible in the nose, yet it usually flowed from the naso-frontal canal after it had been probed, and in comparison with this drainage of the sinus all other methods of treatment were of little use.

BOOK REVIEWS.

I.—**The Pathology of the Eye.** By J. Herbert Parsons, B.S., D.Sc. (London), F.R.C.S. (England); Assistant Ophthalmic Surgeon, University College Hospital, etc. New York: G. P. Putnam's Sons. London: Hodder & Stoughton. Vol. I., 388 pages, 1904. Vol. II., 382 pages, 1905. Price $3.50 each.

It speaks well for the development of a specialty when a special pathology treating the lesions of but one organ is appearing in four volumes. Yet in the last decades so much work has been done along the line of the microscopic study of ocular lesions as is evidenced by turning to the contents of a number of the special journals devoted to the eye, that a literature on any one subject has sprung up which is often unwieldy and almost unmanageable. This work is therefore most timely and no one could be better qualified to successfully undertake this task than Mr. Parsons, who is well known by numerous contributions to scientific ophthalmology.

The work is divided into two parts; the first, now complete, is on the "pathological histology of the eye," and the second is to be on "general pathology of the eye." In Volume I., on the pathological histology of the eye, each part of the eye is taken up in turn, beginning with the lids, conjunctiva including bacteriology, cornea, sclera, iris, and ciliary body, then continuing in Volume II. with the lens, vitreous, choroid, retina, optic nerve, orbit, and lachrymal apparatus. Each part is introduced by a brief description of the normal histology and ends with a bibliography. The work is profusely illustrated with chiefly original photographs. These in the author's belief insure absolute fidelity. The illustrations are not all equally satisfactory, they sometimes lack clearness, and the details are often indistinct but they fulfil their purpose adequately. The author's style is lucid, uninvolved,

and succinct; tedious discussions are omitted. The work will be essential to all workers with the microscope and of value especially to all English-speaking ophthalmologists. We look forward with great interest to the appearance of the concluding volume. A. K.

II.—**The Changes Produced by Inflammation in the Conjunctiva** (Hunterian Lecture R. C. S., 1905). By M. S. MAYO, F.R.C.S. John Bale Sons and Danielsson Lim., London, 1905. 179 pages. Price 10*s.* 6*d.*

This is an histological study of certain inflammatory changes in the conjunctiva. With the aid of Pappenheim's plasma stain the author has been able to trace the origin of mononuclear leucocytes and plasma cells in the conjunctiva and favors Whitfield's view that these structures are derived from endothelial and perithelial cells. After treating of the development, comparative anatomy, and condition of the conjunctiva at birth, the changes are minutely described which occur in each layer of the conjunctiva in inflammation. These extremely painstaking studies will be of great interest to all workers in microscopic anatomy. The subject of lymphoid tissue in the conjunctiva and of the formation of follicles is of value and interest also to the clinician from their connection with trachoma. According to the author there is no lymphoid tissue in the conjunctiva at birth; this arises subsequently from the endothelium as a response to some form of irritant. The description of trachoma is the one which is generally held. The follicles in follicular conjunctivitis and in trachoma differ inasmuch as in the former plasma cells preponderate and in the latter there is necrosis. In treatment of trachoma expression is indicated in the cases of follicular enlargements. In the subsequent treatment or in other stages of trachoma the author is an ardent advocate of the X-rays.

A. K.

Tafel IX.

Fig. 2.

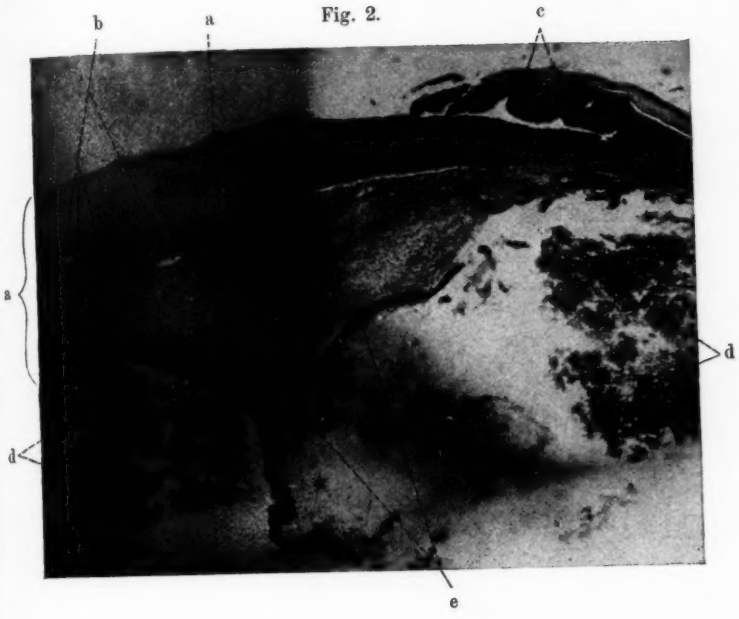
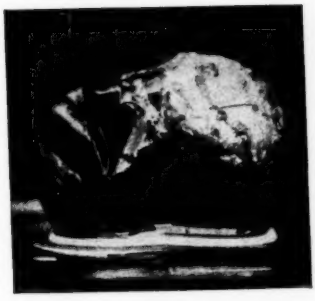
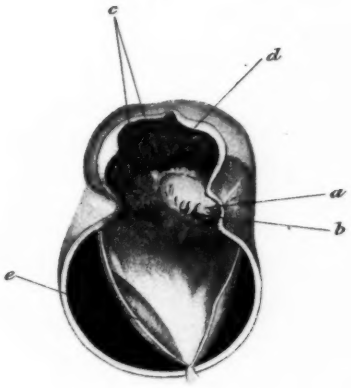


Fig. 1.



VERLAG VON J. F. BERGMANN IN WIESBADEN.

Fig. 2.



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